A HITCHCOCK PUBLICATION

assembly & fastener ENGINEERING

JUNE • 1959

In this issue: **Power Tools for Tightening Fasteners—Part 2**

"Spot Automation" Speeds Assembly at Trade-Wind

Engineering Small Parts Reaps Profit at Proctor Electric

Problem...pressure...proof!

This man is solving a fastener problem

the **Pheoll** *way!*

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The MAN in the photograph, incidentally, *is* a Pheoll production expert . . . John Trandel, Foreman of the Cold Heading Department and 43-years-experienced . . . at Pheoll!

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Industrial Fastener Division

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assembly & fastener ENGINEERING

June, 1959 Volume 1, Number 9

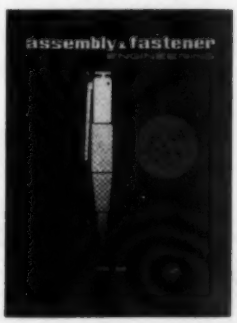
FEATURES

DEPARTMENTS

Subscription rates: $6.00 per year in U.S.A. $7.50 per year elsewhere.

Accepted as controlled circulation publication at Pontiac, Illinois.

• Each type of power tool has its advantages and disadvantages, and each has its particular place in assembly work. For a description of each type, plus detailed drawings of typical clutches for each, turn to the article starting on page 27.



Letters to the Editor

Low Engineering Enrollment

The editorial "Low Engineering Enrollment Again, Why?", In your April issue, was excellent. Reprints should be widely circulated.

Staff Engineer
Engine Division
(Automotive Company)

You certainly have hit at least one of the buttons right on the head.

Those who have been involved in various manpower studies are inclined to believe that a number of factors might contribute to the dip in engineering enrollment. The one you mentioned certainly is a prominent one.

But there are some other things which also influence the problem. They are the registrations in the so-called pre-engineering curricula in liberal arts schools, the "3-2" programs where the student takes three years in liberal arts and then two years in engineering to receive a degree in each; high entrance requirements; and undue publicity on the importance of science relative to engineering.

The Engineering Manpower Commission of the Engineers Joint Council is making a study to get as much authentic information as possible. I expect that it will be available within a few weeks.

W. Leighton Collins
Secretary
The American Society for Engineering Education
Urbana, Illinois

The Name is "Thomson"

We found your article, "Sliding Fixtures Aid Camera Assembly," excellent except for one major flaw. The machine pictured assembling the fine Ansco camera is a J. L. Thomson rivet setting machine, not a "Thomas riveter."

After 74 years of use (and misuse) the name Thomson stands for economy, efficiency and quality in fastening. We are quite proud of it.

G. Robert Cox
Advertising Manager
Judson L. Thomson Mfg. Co.
Waltham, Massachusetts

Continental has the cure for vibration "headaches"

the one-piece locking screw that won't work loose

IN MARKET CARTS — STAY TIGHT, RESIST SHOCKS OF SEVERE SERVICE

HOLTITE NYLOK hex head cap machine screw fastens chrome-plated steel tubing at right angles. Driven through holes in one section into tapped steel plug in end of adjoining part. Hold securely despite punishment of customer use.

IN CARBURETORS — HOLD ADJUSTMENT OF ANTI-STALL CONTROL

Hex head steel HOLTITE NYLOK machine screw maintains constant adjustment of anti-stall device attached to carburetors. Holds spring at required tension without variation through wide range of temperature changes.

IN EXHAUST FANS — HOLD MOTOR SECURELY DESPITE VIBRATION

Phillips truss head steel HOLTITE NYLOK machine screws are driven through rubber insulation mount into flange of vertical mounted motor. Screws do not loosen, resist constant vibration.

IN SHEARS AND SCISSORS — HOLD BLADES IN PROPER ADJUSTMENT

Binding head steel HOLTITE NYLOK machine screws are driven through drilled hole in one blade into tapped hole in mate. Hold proper blade contact, — permit easy disassembly for sharpening.

HOLTITE® NYLOK® Self-locking Screws

Resilient nylon plug (A) sets up a lateral thrust, smoothly wedges mating threads together (B). All locking action is on threads: head is not stressed. Locking is positive . . . seated or unseated.

One piece — no separate parts
Can be removed and replaced
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Locks seated or unseated
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HOLTITE® NYLOK machine screws are the simplified self-locking fasteners with the Nylon insert that eliminates the need for lock washers, jam nuts, wiring and similar devices. If you have assemblies where screws *must stay* where they are set, NYLOK is your practical choice. The applications above show how you can save trouble and complaints, — give your product a sales advantage.

CHECK YOUR ASSEMBLIES — find out where Continental engineered fasteners, like HOLTITE NYLOK, can cut your assembly costs. Plan now to consult the Continental Assembly Specialists. They will analyze your operations and tell you which fasteners — *standard or special* — can save you most. For prompt service, write or phone: Continental Screw Co., 448 Mt. Pleasant St., New Bedford, Massachusetts.

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JUNE, 1959 VOL. 1, NO. 9

ASSEMBLY WORK FOR THE HANDICAPPED

There are many types of jobs on the assembly line which can be done just as well, and quite often better, by persons with physical handicaps.

Some companies have found that the blind can become quite adept in the assembly of small parts. Their acute sense of touch permits them to consistently do a much better job than fellow assemblers whose eyes tire and start playing tricks on them after an hour or two of putting miniature pieces together.

Actually, the hiring of a man or woman with a physical impairment can be mutually profitable, regardless of the humanitarian aspect. The disabled person can gain financial independence; his employer can profit by putting his remaining physical talents to gainful use.

The fact that it is economically sound to hire the physically handicapped for assembly line work has been proved by the Department of Labor and the Veterans Administration.

A joint survey in 100 plants compared disabled workers with non-disabled workers. Here are some facts uncovered in the survey:

Handicapped workers as a group produce at slightly higher rates than un-impaired workers on the same jobs.

Handicapped workers have the same minor injury rates as other workers.

Impaired persons actually sustain fewer disabling injuries than non-impaired workers exposed to the same hazards.

There is no significant difference between the voluntary quit rate of physically handicapped and other workers.

Impaired and non-impaired workers have about the same absenteeism records.

Finally, the physically handicapped persons have the same wide range of abilities, skills and interests as the non-handicapped.

Though it provides them with the key to financial independence, the employment of the physically handicapped for assembly line work need no longer be considered charity. It can be a sound investment.

Matt E. Hevenstone

Managing Editor

Captive Quick-Opening Fasteners:

Southco standards provide many benefits at low cost for access through doors, covers, panels and into drawers

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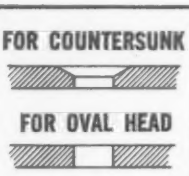

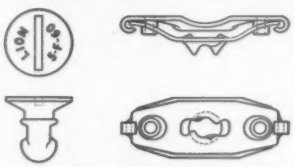

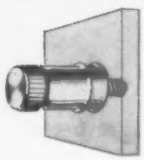

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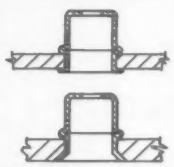
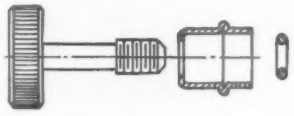
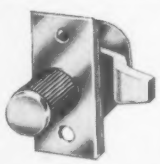
Stand-off thumb screws from stock to eliminate costly, special fasteners. Installed quickly without special tools. Accommodate misalignment. Complete range of standard sizes.

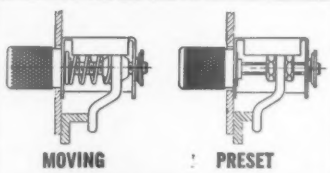


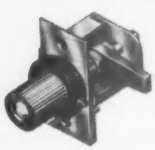




ADJUSTABLE PAWL FASTENERS

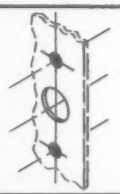
Pre-assembled, quickly installed. Accommodate variations in frame thickness up to ½ inch. One-quarter turn closes, additional turns increase grip pressure. Attractive appearance, long life. Moving or pre-set pawl. Miniature, intermediate and large sizes.

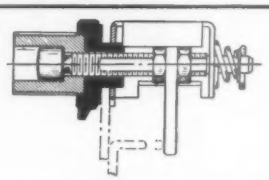




ADJUSTABLE PAWL FASTENER

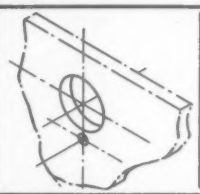
Has twin-knob control. One knob controls pawl, pointer shows pawl position. Other knob controls amount of pressure to seal closure with uniform pre-set compression. Easily installed.

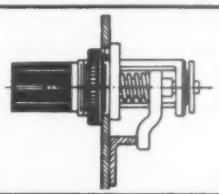




ADJUSTABLE PAWL FASTENER

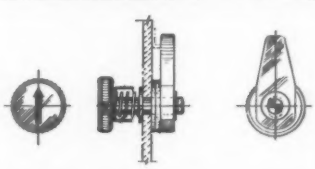
Compact and rugged. Eliminates rivets or bolts to save installation time. Three types cover grip range up to ¾". Supplied either with integral metal and plastic knob, plastic knob or for your knob.





ARROWHEAD DOOR LATCH

Requires only one hole to install. Operates on quarter turn. Holds under spring tension. Arrow shows pawl position; no pawl stops required. Uses minimum inside space.



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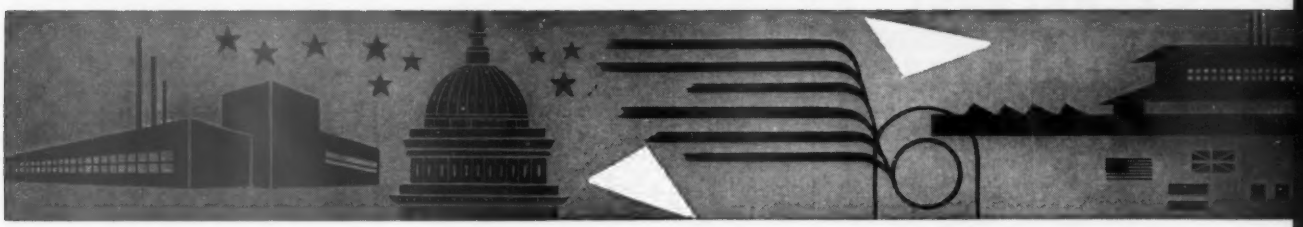
The State of Business



INFLATION—MANAGEMENT'S MOVE?

by **Leland Hazard**

Every decade has its question, and in our time it is, "Who is the villain in the inflationary piece?" Is it wages or profits? Management or labor? Wall Street or Main Street? The plain truth is that nobody knows.

But when people feel threatened, they do not wait for proof. They decide. A recent poll found inflation the first of 20 domestic problems that Congress should attack; and—a remarkable development in public sentiment—government, big business, and labor unions shared the guilt within 4%

Inflation goes to the heart of capitalism. In our economic system we have the following sequences: people work; they save some of the fruits of their labors; they invest these savings in facilities for producing goods or rendering services; the goods-or-services are sold at prices sufficient to cover the costs and a profit. If any of the components gets out of alignment—demands too large a portion of the available price—the system fails.

LELAND HAZARD
Board of Directors
Pittsburgh Plate Glass Co.

Mr. Hazard, after 20 years with Pittsburgh Plate, left a vice president and general counsel's duties Jan. 1 to teach industrial administration and law at Carnegie Tech.

Or, to state the case in another way, if the price keeps going up and up so every claim on the enterprise, however extravagant, is satisfied, then there is inflation and the system fails.

No one knows certainly how high the prices must go before the system fails. No one knows certainly just what is creeping inflation, or when it becomes runaway inflation. And no one knows certainly what comes after this.

The evils of inflation and the extent to which inflation can continue before it becomes dangerous has been discussed, both pro and con, widely. But in a common-sense American way, most of us reason that there must be a top, and that even a creep can lift us in time to a dizzy zenith from which a fall, like that of Icarus, could be fatal.

What worries common-sense Americans these days is whether our system can last. People who care about haircuts have, more often than not, the necessary $2.00. But they are rightly concerned about any price which has moved upwards so much, so fast, in such a short time. Where and what is the end? This is the fear of inflation.

The two classic causes of inflation are absent from the scene. There is no shortage of goods; there is no excessive supply of money. And yet we have inflation. From this a new term has emerged—wage inflation. Higher wages, higher prices. Management says to labor, "Keep the wage down, and we can keep the price down; put the wage up, and we have to put the price up." Labor retorts that the cost of living keeps going up and that management does not indeed need to increase its prices.

The search for a villain is indeed frustrating. Management believes that unions should refrain from higher wage demands. A surprising percentage of the public, according to polls, is also coming to that persuasion. But I do not expect any relief from that quarter. Union leadership is necessarily too political. Workers' demands are varied and disparate; inter-union rivalries are not ended; employment is relatively full. These are not the conditions under which a realist expects unions to withhold wage demands.

Management must begin now to refuse wage increases even though we know certainly that our refusals will produce strikes. We have been too timid about strikes. In extenuation I should say that we were highly conditioned against strikes in World War II, when virtually every significant manufacturer had converted to some form of war production, when any interruption threatened national survival.

continued

State of Business, continued

But the war is over now, and the postwar period has passed. Nevertheless labor has the habit of asking for wage increases, and management has the habit of granting them and passing on the cost through increased prices.

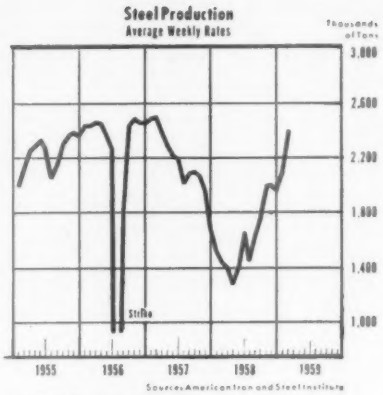
Powerful influences work to coerce management to say yes to labor—not only the conditioning mentioned above but also the general stigma which attends a strike ("That company seems to have bad labor relations.") More specifically, the manufacturer often is a supplier to another manufacturer, so that interruption of supply closes the customer's plant, an event which may well cause that customer to change his source of supply; or a manufacturer hesitates to risk a strike which will take his brand name off the shelves while a competitor's brand name is in ample supply.

The price of saying no to further wage increases will be some strikes. No one wins a strike. But this cliche is only partly true. A strike that lasts long enough has a considerable and favorable effect for a long time. It hurts enough to be remembered. Its sobering influence affects the future.

If management is ever to exercise its great powers in the broader interests of the capitalistic system rather than in the narrower interest of production of goods at any cost, this is the time to say no.

Strikes of themselves will not necessarily curb inflation. But if management has the wit to make the issue clear—that the strike is inflicted and suffered not in greed but in sober conviction that the American system is in jeopardy—a great advance can be made in our economic understanding. People do learn what they must learn. And crisis and drama are great aids to learning.

The hour is late and the need is great. American capitalism can be priced out of the market by high costs, but, more than that, capitalism, unless it conquers inflation, can become noncompetitive in the global struggle for men's minds and hearts. •

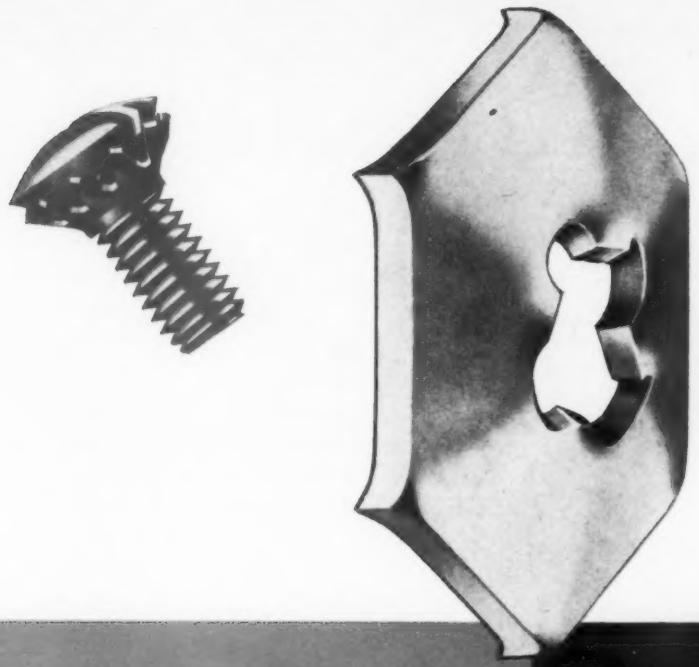


Steel output has risen sharply and is approaching record levels.

Industry Briefs—

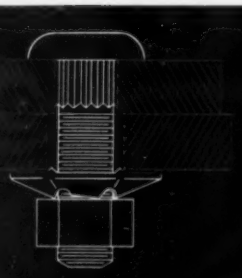
That gleam in the appliance dealer's eye is due to 20% increased sales this year, firmer (and higher) prices. Manufacturers—cheered by first-quarter profits—are rehiring, stepping up production . . . Spring auto sales peaked near 20,000 a day. One market estimates: GM (46%), Ford (29.6%), Chrysler (14.5%), American (7%), Studebaker-Packard (2.5%), others (.4%). J. G. Gordon, GM president, predicts a 3% sales increase for five years, leading to 7¼ million passenger car sales by 1965 . . . A survey of Chicago purchasing agents reveals that 44% expect to have a 60-day supply of steel on hand June 30, 56% to have a 90-day inventory. Since steel makers are operating near 100% capacity (2.9 million tons a week), and top consumption is 2.1 million tons, a third-quarter cutback seems likely, strike or not . . . Machine tool orders are highest in 19 months, mostly replacement items . . . The 1400-member screw machine products industry is hopeful of equalling 1957's $485 million volume. And a New York barber shop will cut your hair with solid gold scissors for $5. Any connection with the "bullish" stock exchange where a membership sold recently for $150,000? •

This article is the major substance of a letter written by Mr. Hazard to the **Harvard Business Review** and published in the issue, March-April 1958.



HOW TO SELECT
COST-SAVING

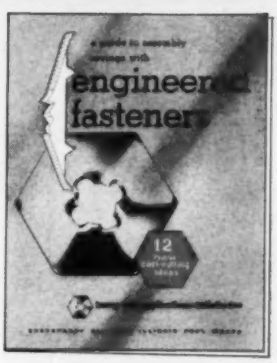
fasteners for heavy duty applications



A TYPICAL EXAMPLE:
How to Fasten Securely to Avoid Shifting

Where considerable tension in the fastening is needed to keep the parts from shifting, the Shakeproof®-developed Pyramidal Lock Washer* should be used. This washer spans large clearance holes — provides tension needed to keep parts securely fastened and in alignment.
*U.S. Pat. No. 2,794,476

For want of the right fastener, man-hours and money are often needlessly lost! It's vital to economical assembly line production to specify fasteners for each application that will do a fast and effective job *every* time. Fasteners engineered by Shakeproof assure maximum locking, reduce handling, and provide many additional functions that save assembly time, reduce production costs and improve your product's quality.



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Shows typical examples of money-saving fasteners developed by Shakeproof engineers for heavy metal applications. Offers testing samples. Write for your free copy today!

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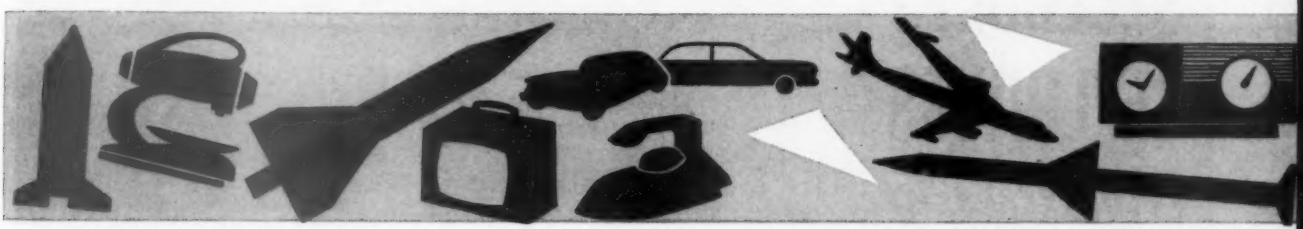
Industry at Work



WESTINGHOUSE WELDING, CONVEYOR IDEAS MODERNIZE TRANSFORMER ASSEMBLY

Turning out distribution transformers at the rate of one every two minutes is no trick at Westinghouse Electric Corporation's new plant at Athens, Georgia.

The plant uses almost five miles of material-handling equipment of various kinds. These include in-floor tow lines, overhead monoveyors, power-and-free conveyors, and many special racks, trucks, and transfer devices.

The 560,000 sq. ft. manufacturing area is laid out for straight-through flow of materials from receiving to shipping floor.

Flow is through the three major feeder areas—tank and core fabrication, and coil manufacture. Then using a unique power-and-free overhead conveyor system, these components are transported in the proper sequence and timing into a humidity-controlled room for final assembly operations, including core-coil assembly, tanking, evacuating and oil filling, and the finished transformer moved to tests, final paint touch-up, and crating.

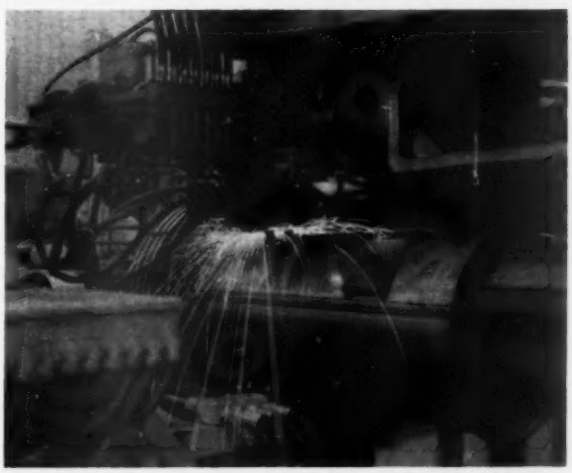
A highly mechanized line fabricates one transformer tank every two minutes. This line includes 15 major machines integrated with ten automatic positioners, two automatic turnovers, and approximately 525′ of powered roller conveyors. The equipment performs 55 separate operations, including arc projection and seam welding, metal forming, marking, punching, bottom seaming, and leak testing and will produce tanks for transformers rated from 5 through 250 kva.

Cylinders are fed continuously, end-to-end, into a side-seam welder. A grinding station removes 3″ from the weldment at each end of the tank shell and a break-off arm separates the continuously welded shells into individual cylinders. The shells are fed up an inclined power conveyor to a dual-gravity conveyor which is selective in sending tanks to either one of two machines that automatically bead and flange the shells.

Each shell is then tilted 90° from the horizontal and fed to the first of eight welders and two punch presses.

These ten machines all use an automatic positioner,

continued



One of five automatic projection welders in Westinghouse distribution transformer plant attaches pads, lugs and studs to tank.

View of tank fabrication line. Front tank has been rotated by powered wye-clamp rolls until exactly positioned radially for welding. Loaded positioner (wheel at right) holds indexed tanks for arc welding of hanger lugs.

with its associated cam tracks for picking up radial locations, and longitudinal tracks which pick up all the longitudinal locations on the tank.

Cypak static controls automatically sequence the tank through all movements at each of the ten stations.

Five of the next 10 machines are similar projection welders, all rated 400 kva, single-phase. Standardization was important from the standpoint of maintenance and spare parts stock.

These five machines weld various pads, lugs, and studs to the inner and outer walls of the tank.

There are two identical seam welders, 150-kva, three-phase, which weld fins to the tank wall.

The conveyor system includes 1700′ of power-and-free conveyors, 24 automatic switches, 5 powered elevators, 14 special lift devices, an automatic test wheel, and several hundred carriers.

It consists of two basic power-and-free conveyor systems made up of eleven separate conveyors. These conveyors deliver the major transformer components to the first assembly operations, then carry the core-coil assembly through all of final assembly and test to the crating and shipping area. This conveyor system is the backbone of a new approach to transformer assembly based on the continuous assembly line principle, utilizing scheduled and matched components, and paced moving assembly lines with forced feeds.

THE BABE RUTH of bits drilled 2650 feet of salt at the Canadian Rock Salt Co. mine in Ojibway, Ontario. Tipped with Carmet cemented carbide, the bit not only topped the previous record of 1450 ft. but completed 46 holes before requiring regrinding.

The system has great flexibility. It can be made to: (a) move carriers horizontally at many different speeds on the same system; (b) to hold carriers at a standstill for loading, for long assembly work or in storage floats; (c) to move carriers vertically into and out of overhead storages or floats; (d) to move them in and out of test tanks, wheels, sound rooms.

The system lends itself to several different types of paced work operations. It can be divided automatically from a single line into multiple lines and recirculating loops, and back into a single line. It saves floor space, keeps material off the floor, and permits personnel and trucks or buggies to pass through and under the conveyor lines. It paces the assemblers and lessens material damage due to poor handling.

STAINLESS STEEL MUFFLERS BEING WIDELY TESTED

Up to this time, automotive mufflers have been made of a mild steel which has lasted, on an average, one and a half years, or about 15,000 miles. Some authorities say the life of the average muffler is nine months.

Allegheny Ludlum Steel Corporation is cooperating with a number of muffler manufacturers in the use of stainless steel for mufflers.

The corrosion test used by the manufacturer making this survey to evaluate muffler materials is very rigid. A thin strip of the metal being tested is partially immersed in a beaker of boiling engine condensates inside a chamber held at 200°F. for about 600 hours.

Up to this time, three types of stainless steel have been tested in this manner: 430, 304 and 310. None has shown any evidence of either liquid or vapor phase corrosion. •

NEW TENZ-NUT®

preassembled for fast production . . .

Now — a spring washer preassembled on a hex nut — to save time in all types of assembly operations where the tested principle of bolt, nut and spring washer are required. Developed by Eaton-Reliance, this new fastener is now available for production use.

The spring washer — a modified Belleville, or "cupped" type — is firmly attached to the hex nut, yet it spins freely during application and removal. Tenz-Nuts are reusable.

The proven locking principle of the cupped-type washer, when combined with a hex nut, gives you a versatile fastener for automatic assembly operations. It is particularly applicable where finished parts are being assembled and it is desirable to minimize surface marring. Tenz-Nuts may also be adapted as sealing nuts.

Write for our new Engineering Bulletin which fully describes Tenz-Nuts.

Eaton also offers a complete line of Keps®— hex nuts preassembled with tooth-type washers. Our fastener engineers will gladly consult with you on possible applications on request.

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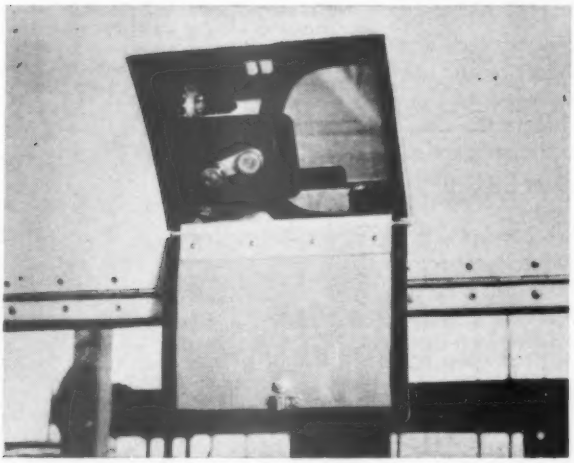
Assembly and Fastening Ideas



Quick access to the sign box on this bus is allowed by Velco-fastened panel. Woven nylon strips are bonded to the metal. Tiny hooks engage thousands of tiny loops.

NEW USES FOR BURR-LIKE NYLON FASTENER

Industry has discovered that an interlocking nylon tape fastener made by the Velcro Sales Corp., New York City, is not limited in application to the fabric field.

Invented by George de Mestral, a Swiss, who got his inspiration after walking through a burr patch, the fastener is being used by some aircraft companies to hold various interior panels in place. Continuous belts for rotary vacuum filters used in chemical and paint plants are easily attached, detached and adjusted with tabs of the material. It is also used in hanging draperies and in fastening wrap-around bandages.

Consisting of two strips of woven nylon tape, tiny hooks engage thousands of loops when lightly pressed together. Velcro closure reportedly can be opened and closed over 30,000 times without loss of holding power. Stress is distributed over the entire surface area. It can be sewed, bonded or stapled in place.

TRIED BROACHING FOR MOUNTING PARTS?

"Knurl" broaching for mounting miniature precision gears on hubs without deformation of the gear concentricity is being used successfully at Librascope, Inc., Glendale, Calif.

The unique broaching technique can also be used for mounting miniature shafts on linkage arms or into panels where dimensions are too small to permit normal fastening methods.

The method, developed by Willard J. Opocensky, staff engineer, is now applied to mounting tiny precision ring gears on hubs of Librascope's new, miniature 2-pinion differential, which is used in precise electromechanical equipment where shaft rotations must be compared.

On most applications, the ring gears, which act as side drive gears, are too small for use of pins or

continued

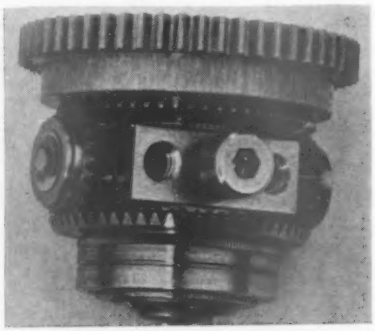
any types of set screws.

The final solution was to apply a fine pitch knurl, usually 80 pitch, to the hub surface. This knurling increases the diameter of the hub by .004 to .005" in the local area. The principle is similar to that of shaft splining. The knurl pitch is dependent upon load to be transmitted; use of an 80 pitch knurl provides 50 in. lbs. minimum torque.

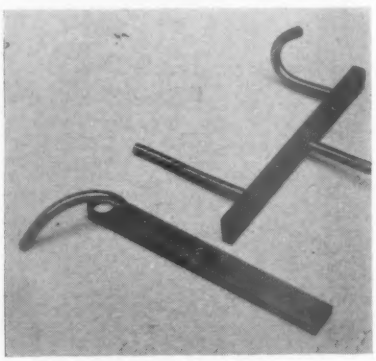
The base of the hub is knurled to slightly less than half the width of the ring gear to be applied. After knurling, a groove is machined around the hub at the leading edge of the knurl. This chip groove cuts across the ends of the knurling and actually forms sharp edges which act as microscopic broaching teeth as the ring gear is pressed onto the hub. The groove collects the material removed from the ring gear, and prevents galling and spalling of the metal.

About 60% of the interior surface in the ring gear adjacent to the hub mates with the hub within a tolerance of .0004". This insures concentricity of the gear pitch line relative to the bevel gear hub. The remaining 40% of the surface is utilized for the knurl broaching and chip groove.

The differential is designed for a maximum torque of 12 in.-oz. in the gear train. The knurl broaching applied to the side gears provides a torque resistance of the hub and gear bond of over 50 in.-lbs., well over the maximum rated limit.



Differential is shown with one ring gear in place on bevel gear hub. Other hub has already been knurled and the chip groove at the leading edge of the knurling has been cut. The second groove cut around the middle of the hub is a staking groove, to permit fastening of the aluminum or brass gears.



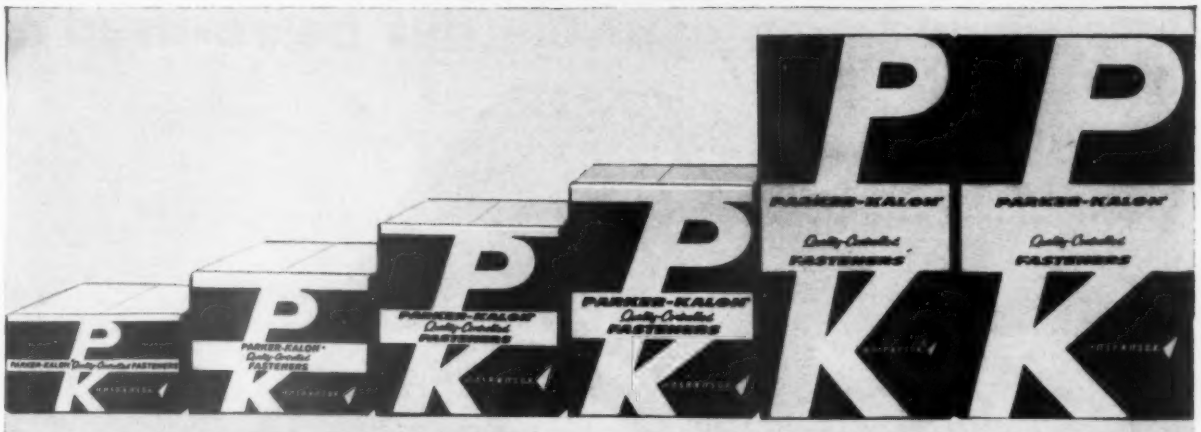
In destructive tests two shafts gave way before any loosening or elongation of mounting hole. One shaft was twisted 360°, another bent full 180° with no effect on broached bond.

METAL FABRICATOR FINDS STITCHING FIVE TIMES FASTER

Sheel metal contractors are as quick as any to seize new methods for reducing fabricating costs. The Huber Sheel Metal Co. of Bell Gardens, Calif., found metal stitching five times faster than previous methods in assembling the bird screen for fresh air intake openings on vents.

First, the sides of the frame are sheared, then formed in the brake. The over-lapping joints at the mitered ends are stapled in three places with a Bostitch machine, and the screen is cut to size.

Set into the flanged seam, the screen is stapled in place, the machine forming and driving its own staples from a coil of 26-gauge galvanized wire. Then the flange is bent down with a mallet. •



A new concept in bulk-packaging of tapping screws...

the all-new P-K® BULK-KEG

Now . . . famous P-K tapping screws can be delivered to you in fixed keg quantities. Developed by Parker-Kalon, with the ultimate user always in mind, the new Bulk-Keg is designed to simplify ordering, handling, inventory control and production use. For the user's convenience, Parker-Kalon will package 80% of all popular stock size tapping screws in kegs containing 15,000 pieces.

15,000

Other stock sizes will be packed in quantities from 2500 to 25,000 depending upon size of fastener. Ask your distributor to show you the P-K Bulk-Keg Package Schedule.

Here's how the new P-K Bulk-Keg can help you

SAVE TIME... All information for speedy identification of keg contents is printed in *large*, easily-read type on *two* sides of the keg. *Tally Card* packed inside each keg aids maintenance of physical inventory at all times. Control is easy, accurate—from order desk to storeroom to production line.

SAVE LABOR... *In the stockroom* there's no fumbling, no waste motion. Every P-K Bulk-Keg is uniformly 9″ wide by 9″ deep (with a single exception). All stack neatly, quickly and easily. *At the assembly line*, P-K's new Tear Tape feature makes opening and re-sealing of kegs simple and efficient. A pull on the tape and the pre-slotted cover opens to make a hinged top. No need for pliers, wire cutters, or aggrevation.

SAVE MONEY... Neatly sealed P-K Bulk-Kegs make allocation of production quantities fast and orderly. No in-shop distribution of screws in open trays. No hazardous spilled fasteners on factory floors. Loss caused by dropped and broken packages in stockroom or at the assembly line is eliminated. The new keg has been independently pre-tested by Container Laboratories, Inc. of New York. It meets all drop, compression and impact tests.

For immediate delivery of P-K tapping screws in the handy, all-new P-K Bulk-Keg, call your P-K distributor—today!

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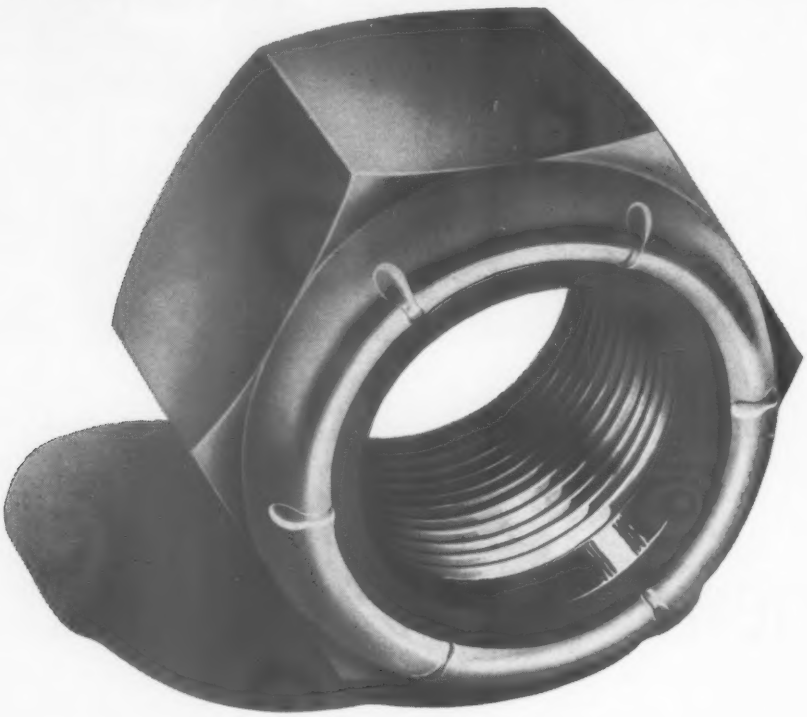
How many times can this nut be re-used?



ON ANY BOLT OF STANDARD QUALITY, THE NYLON INSERT ELASTIC STOP® NUT PROVIDES DEPENDABLE LOCKING TORQUE

for over 50 on-off cycles

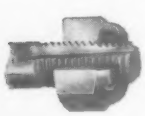
The remarkable wear resistance of the tough nylon collar plus its elastic recovery characteristic make it possible to remove and re-use the standard Elastic Stop nut at least fifty times. This familiar red collar—an integral part of an Elastic Stop nut—grips the entering bolt threads with a perfect fit which dampens impact loads and resists turning under the most severe conditions of vibration and shock. When the nut must be removed for routine maintenance, the nylon collar tends to resume its original shape and, on re-installation, grips the bolt threads as effectively as on the original installation.

Prove it to yourself! Check the coupon for a copy of Recommended Test Procedure for Determining Re-usability.

Re-usability is just one of the advantages of the nylon insert Elastic Stop nut. The constant torque that locks the nut at any position on the bolt: the inertness to gasolines, oils, salt atmospheres, cleaning compounds and common acids: the easy identification on the assembly line or in the field: the one piece construction that simplifies installation and reduces cost—these special features have made the Elastic Stop nut the standard of industry for tough applications.

Elastic Stop nuts are available in thin and regular height hex types in sizes ranging from a watchmaker's 0-80 through 3 inches, also many special shapes to meet your unusual design problems. In standard finishes and materials including carbon and stainless steels, brass, duronze and aluminum.

ELASTIC STOP NUT CORPORATION OF AMERICA



DOUBLE DEPENDABILITY

The dependability built into every Elastic Stop nut builds itself into the dependability of every product on which it is used.

Elastic Stop Nut Corporation of America
Dept. S31-697, 2330 Vauxhall Road, Union, New Jersey
Please send me the following free fastening information:

- ☐ Recommended Re-usability Test Procedure
- ☐ Bulletin No. 5901 showing stop nut design applications on heavy-duty equipment.
- ☐ ESNA condensed hex nut catalog No. 706.

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Torque wrench calibrator is moved on a cart to different White assembly areas for daily inspection of torque wrenches.

WHITE MOTOR CO. RIGIDLY CONTROLS BOLTING OPERATIONS

White Motor Company has instituted a rigid quality control program on bolting operations at its truck manufacturing plant at Cleveland, Ohio.

First, White made a study of all truck connections. Aided by information supplied by the Society of Automotive Engineers, torque standards were developed for every type of bolt and screw used, depending on the specific application.

The next step was to hold the torque limits within a close range on the actual assembly line.

A chart was prepared, showing each of these key operations, and the torque standard for each.

The problem remaining: making sure that torque wrenches were delivering proper torque to the bolt. And here a Skidmore-Wilhelm torque wrench calibrator, with a range of 0 to 600 ft.-lbs., is used.

A schedule is set so that certain wrenches are checked each morning by the gate inspector. The calibrator is moved from one station to another. The inspector has a mimeographed sheet detailing each key bolting operation in his department, and what torque should be applied. In a blank space next to the torque specification, he places the actual torque comparison as read on the gage. This sheet is turned in daily to the inspection department, which can tell at a glance whether a torque wrench is registering properly.

The depth of this program may be seen from the fact that the company's required accuracy in torque ranges from as low as 30 ft.-lbs. to as high as 1,000 ft.-lbs.

COPPER-NICKEL ALLOY CLIPS SOLVE CORROSION PROBLEM

Choice of a corrosion-resistant, but still malleable, metal alloy has solved an appearance problem facing the Wolverine Porcelain Enameling Company of Detroit, Michigan.

These fabricators of porcelain enamel architectural panels have always used clips to fasten their panels to building fronts. The erection process usually required some adjustment of the clip by bending, twisting or even hammering, often causing the protective coating of the steel clip to be damaged. This would lead to corrosion and rust stains.

continued

Copper-nickel alloy clips are spot welded to the enameling iron base of Glasiron panels.

Riverside-Alloy's cupro-nickel (70% copper and 30% nickel) was tested with satisfactory results and subsequently substituted.

TESTS REVEAL ACETAL RESIN PIPE PLUGS SEAL TO 1350 PSI

A quarter-inch pipe plug made of Delrin acetal resin would cost about 75% less than brass, 85% less than carbon steel, and about 95% less than stainless steel.

But would it work? Tests by the manufacturer, E. I. duPont de Nemours in Wilmington, Del., indicate that it would. Because it's a thermoplastic, the threads of the plug conform to the mating threads and provide an excellent seal against pressure.

Whether tightened to 125 in.-lbs., or to a finger-tightness of four or five in.-lbs., every plug tested reportedly sealed off pressures at room temperature up to the 1350 psi limit of testing equipment. It continued to hold at least 500 psi at 250°F.

A possible limitation for pipe plug use is stress relief. Although resiliency is high enough to give removal torques equal to installation torques through 15 consecutive removals, after a prolonged period in tightened position, removal torque drops off to about 65% at room temperature.

In all tests, however, there was no leakage below 500 psi. It would seal well and stay that way in installations where temperature averaged less than 200°F, says duPont.

PIN-INSTALLING MACHINE BOASTS 8-MONTH PAYBACK PERIOD

An operation at a leading manufacturer of gas ranges consists of assembling 78 inconel metal pins into a cast iron gas broiler burner.

These pins (39 on each side of the burner) were once hammer driven into drilled holes in the burner then staked.

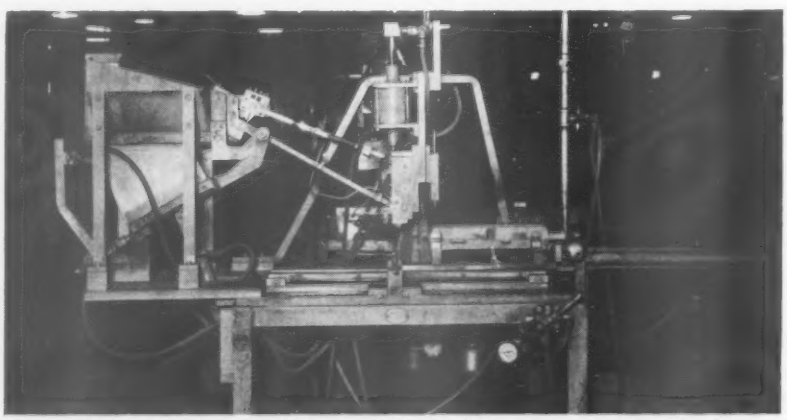
This was a slow operation, and as production rose a bottleneck grew. Mechanizing was needed.

The pins were redesigned with a serrated end to eliminate staking after assembly.

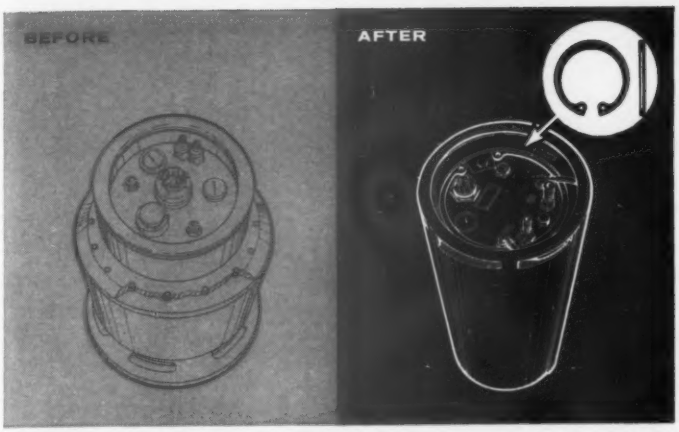
A special purpose air-operated machine was designed, consisting of a pin hopper, pin track, assembling jaw indexing fixture.

Quantities of inconel pins are then dumped into the hopper where the constantly moving hopper blade orients the pin in a slot. The pins are released by an escapement device which allows only one pin at a time to slide down the track into the assembling jaw. On actuating an air foot valve, the jaw grasps the pin and presses it into place in the burner. The indexing fixture then moves the burner under the jaw ready for the next pin.

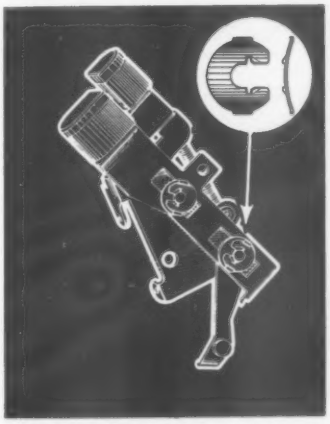
After the piece rate has been set on the machine, it has been found that a savings of $25.10 per 100 assembled burners is realized. At this rate, the machine paid for itself in eight months. •



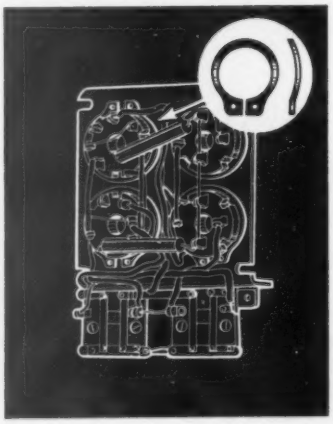
An automatic machine installs 78 inconel pins into a gas range broiler burner. The time savings paid for the machine in eight months.



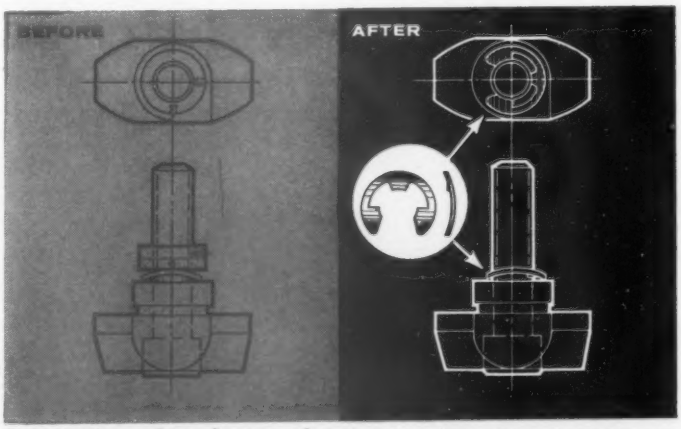
Pressure cover design simplified. Two axially assembled Truarc Series 5002 beveled rings eliminate 27 bolts, reduce machining and assembly time from 78 to 1½ hours and make possible drastic size and weight reductions. Rings retain two covers of a pressurized x-ray unit. **Savings: about $500 per unit.**



Parts eliminated in slide assembly. Two radially assembled Truarc Series 5139 Prong-Lock® Rings provide proper spring tension, eliminate looseness and wobble in this office calculator shift-slide. Original design called for a cut washer, spring washer, and cotter pin — all eliminated.



New way to install electron-tube sockets. Easy-to-apply Truarc Series 5101 bowed external rings lock tube sockets to chassis plate in this assembly. Bowed construction takes up tolerances of molded grooves, thickness of base. Individual sockets are removable for field service.



Quarter-turn clamp improved. A bowed washer and two locknuts were eliminated in this quarter-turn jig-and-fixture clamp by a Truarc Series 5131 bowed E-ring. The radially assembled ring holds the screw captive, provides required rotational drag between parts with sufficient tension to insure tight fit when the screw is first engaged. Typical savings: **$1.35/unit—assembly up 70%.**

Truarc rings for end-play take-up offer significant design advantages

A number of Truarc retaining rings are available to take up end-play or loose fit caused by accumulated tolerances and wear. The rings often eliminate spring washers, collars and set screws, nuts, bolts, rivets, cotter pins and other conventional fastening devices with outstanding cost savings in machining and assembly time.

Truarc retaining rings designed to deal with the end-play problem are of two general types: **bowed rings** for resilient end-play take-up and **beveled rings** for rigid end-play take-up.

Bowed retaining rings are widely used for preloading bearings, preventing vibration or oscillation in linkages, providing tension on adjusting screws. Of particular interest is the radially installed Truarc Prong-Lock® ring which locks securely to the shaft by means of two prongs. It provides exceptional thrust load capacity, may be used as a shoulder against rotating parts, and often eliminates springs, bowed washers and other tensioning devices.

In beveled rings for rigid end-play take-up, the groove-engaging edge is beveled at 15°. There is a corresponding bevel on the load-bearing groove wall. To take up end-play, the ring acts as a wedge between the outer groove wall and the part being retained.

These are just a few of the 50 functionally different types of Truarc retaining rings. They come in up to 97 standard sizes, six metal specifications, 13 different finishes. The entire line as well as accessory assembly tools, grooving tools, and over 70 typical applications are shown in the new catalog RR 10-58. Write for your copy today. And remember Waldes Truarc engineers are always ready to work with you on your specific projects. Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N. Y.

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TRUARC RETAINING RINGS...THE ENGINEERED FASTENING METHOD FOR REDUCING MATERIAL, MACHINING AND ASSEMBLY COSTS

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This heat control knob and accompanying spring clip retainer for Proctor toasters were the result of three months of engineering effort.

Without proper design of spring retainer and maintenance of close tolerance on production parts, this pressed fit might be too tight for assembly or disassembly, or so loose as to be unreliable in service.

by **Darrell Ward,** Engineering Editor

ENGINEERING SKILL REAPS PROFIT FROM SMALL PARTS

How much engineering should be applied to a simple mechanism which can be designed in different ways to present or solve different kinds of assembly problems? One would think that in many instances, the simpler devices incorporated in complex assemblies should not, or at least would not warrant too much attention from highly skilled engineering talent.

Take the case of a simple press-on friction fit type of control knob. If the knob is somewhat like the popular spring-clipped friction-fitted knobs that have been used on radio controls for years, how much engineering time would you devote to the design of the knob and the spring clip? Would you spend three days, or would you take three months to do a better job?

Depending upon circumstances, most people are likely to say three days. Not so with Proctor Electric Company, and particularly in their Mount Airy, N.C., plant which specializes in electric toasters and toaster units for many popular brands whose names appear on the case. Engineers actually kicked their control knob problem around for a period of three months to arrive at what they considered an ideal compromise of all problems involved. This application of engineering talent paid off with some rather extraordinary eliminations of costs formerly associated with much slower assembly operations.

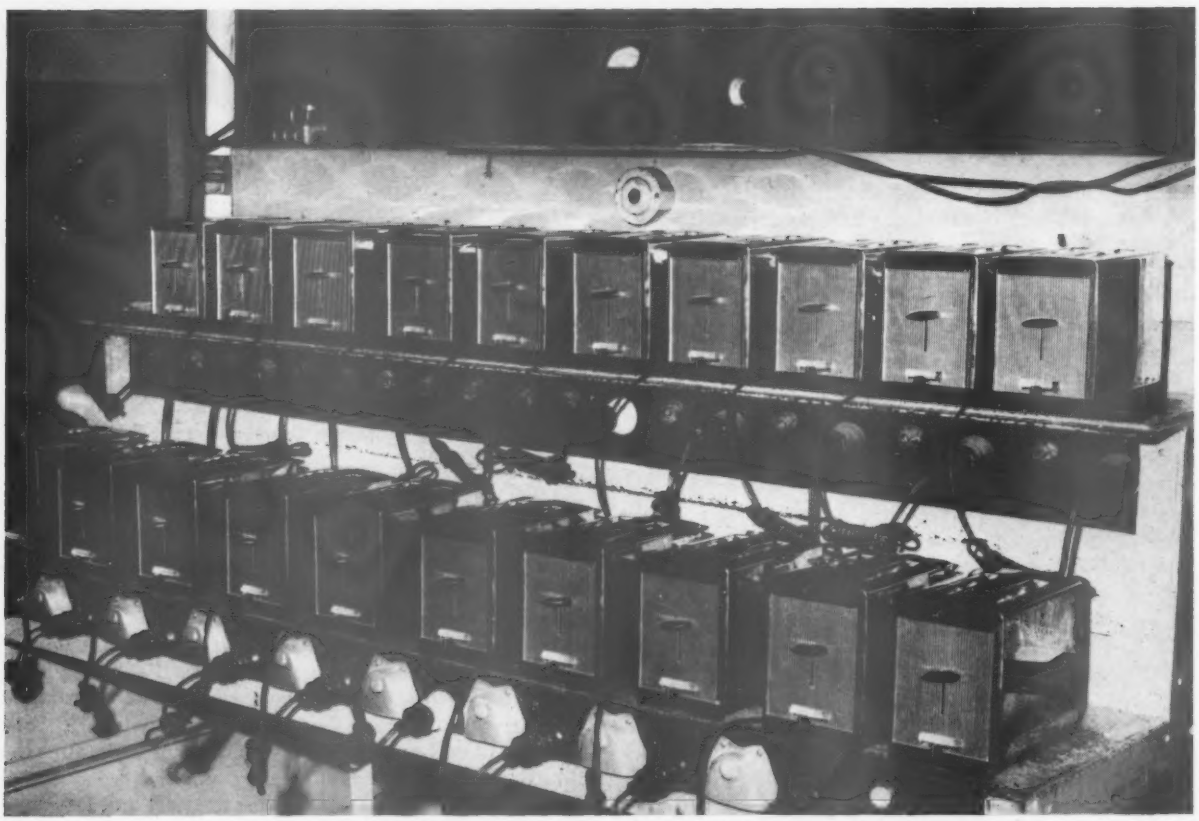
Self-fastening is used, when practical, to minimize cost of fasteners, storage and handling of parts, and to speed assembly operations. When a fastener is required, Proctor relies on the more specialized experience of vendors to supply a standard fastener if a special can be avoided, or a special fastener which can be used on more than one model, but in every case, a fastener which is readily available commercially.

This is not always possible, so Proctor engineers will design the most practical special fastener, if needed, to serve more than one purpose in application or solve more than one problem in design.

We discovered an excellent example in the control knob and self-locking spring retention clip used on the No. 1474 square toaster. Original design called for a tapped hole and set screw in the knob. Best location for assembly convenience would have been to drive the screw from the top. Obviously, this would have been extremely undesirable for appearance. Next best, mechanically, would have been to drill from the side in a less noticeable location. This would have made an undesirably deep hole and very slow running up for the set screw. The

continued

With spring clip inside the molded knob, the knob is simply pressed on the heat control shaft. The toaster is upside down at this point of assembly.



All Proctor toasters go through comprehensive operational tests. Tons of fresh bread are used for practical testing since each unit must produce a uniform piece of toast at a given setting before it passes inspection.

third alternate design placed the screw in a hole drilled up from the bottom where it normally would be concealed, fairly easy to assemble and disassemble for service, but still somewhat objectionable to the housewife whose finger might touch the hole when she operated the toaster knob.

Would it be possible to eliminate these characteristics and also save on cost of fasteners as well as assembly if the knob were redesigned for friction fitting instead of set screw locking? Radio knobs were made that way, why not toaster control knobs?

This reasoning sounded good, but the answer was not so simple. In the first place, a Proctor toaster is expected to give at least 15 years of active service under sometimes rugged demands. A simple friction-fitted knob like those used for rotating radio controls could not stand the rough jabbing of an impatient thumb morning after morning, especially in homes where the husband makes the toast before his eyes are opened enough to see what kind of knob he is jabbing. Friction fitting of a toaster knob had to be much more precise than radio knobs.

A friction-fitted toaster knob must stand up under hard service for 15 years, but at the same time, easy to press on during assembly at the factory. This was no superficial problem to be compared with radio knobs. That is why it took about three months of engineering thinking, designing, and testing before Proctor considered the new knob satisfactory.

Here are some highlights of the engineering that went into the problem. First, was it possible to mold a bakelite knob with required tolerance for easy assembly but with proper friction to lock the spring clip securely over a 15-year anticipated life?

Engineers made many tedious measurements with plug gages and feeler gages before they proved conclusively that consistent dimensions were being held in production run parts. Quality control inspectors spot checked over 5,000 parts in production to prove this one factor. They found that shrinkage in bakelite, a serious question in maintaining tolerance, was negligible.

Research had proved that a maximum tolerance of plus-or-minus .002″ in the mating parts would meet the engineering requirements for proper fit. But, knob and self-locking spring clip were not the only parts involved. The shaft of the toaster mechanism was stamped from sheet steel and it, too, had to be held within desired tolerance, otherwise tolerance would mean nothing in the knob or spring clip.

Therefore, Proctor had to obtain assurance from the sheet steel suppliers that the thickness of the metal would consistently run within tolerance. Suppliers were able to confirm this with no trouble.

Having information about consistent thickness of metal parts and uniform hole size in molded bakelite parts, Proctor engineers then were able to determine what limits were to be maintained in friction pressure for the spring clip. Only then could they design proper camber and length in the clip.

But, the question arose over what spring steel would be best for maximum tensile strength. The same friction must be maintained over a 15-year period for normal reliability of the parts. Pursuit of this question evolved into actual design specifications for the spring clip.

Model makers had to make up a number of alternate suggestions for the design, and subject each to exhaustive longevity tests. When practical reliability was proved in these tests, the clip design was finalized on the basis of the best test results obtained, alternate choices being rejected.

The engineering problems involved in original design and further problems worked out on the production line are only part of the task in getting good merchandise into the hands of a consumer. And, if the product is truly reliable, all of these engineering problems extend themselves from the first point of fabrication down to the last day of service a customer expects to get out of the product. So, it was logical for management to raise another question after all the preliminary engineering problems seemed to be licked.

When a toaster, or any other household appliance, occasionally does need servicing, what problems will the service man run into for disassembly, repair, and reinstallation of the appliance? Could the friction-fitted knob be removed and reassembled easily enough, but without detriment to the normal service life? If it had to be removed very often, wasn't it likely to become damaged, or would it begin to slip off in normal service? Would moderate difficulty in removing the knob cause unnecessary problems in servicing?

Engineers had to take their new baby to Proctor's repair service shops in Philadelphia for testing. They had to survey the consumer market and normal service problems through company salesmen and dealers.

Answers to many such questions were the target of this precautionary check. But, they were all summed up in one finding which came out of the effort. Only 5% of all the Proctor toasters ever went into the shop for repairs!

This answer satisfied management on the reliability of the product and the small percentage of repairs which could ever become a problem. With minor improvements, final approval was given.

By going to the spring clip and eliminating set screws, the cost of the one locking device reduced parts cost approximately 10%. With faster assembly of the clip, which was merely inserted in the hole before the knob was pressed into place, assembly costs were reduced another 30% or more. On top of this, the cost of carbide drills and high speed taps formerly used for set screw holes in the bakelite knob was totally eliminated to make an additional reduction of about 1/10c per hole.

Changes like this toward improved product reliability and reduced costs of production are not made overnight with snap judgment in the shop. Creative thinking and engineering skill often can be applied profitably, on what might seem to be the most insignificant problems in a plant. •

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Second, Phillip screws end assembly waste. By preventing driver skids, they save costs of replacing or refinishing damaged parts, time loss of disassembly and reassembly, and injuries to workers. Third, because of their extra holding power, fewer or smaller Phillips screws can often be used. This saves cost of screws, labor and/or weight.

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POWER TOOLS FOR TIGHTENING THREADED FASTENERS

This second of two articles covers the types of drivers for tightening fasteners. The first part was concerned with action of the fastener as it is tightened.

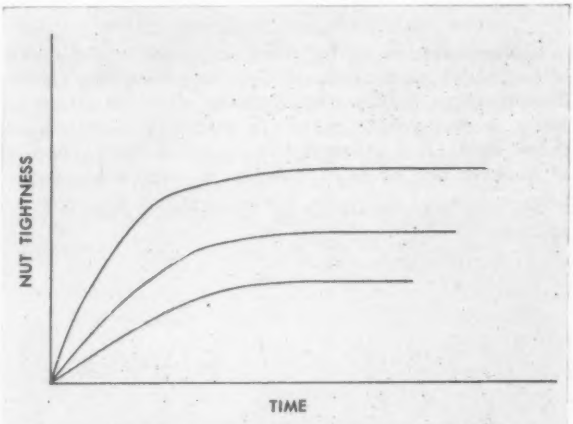


Figure 10—Curves of tool output during fastening.

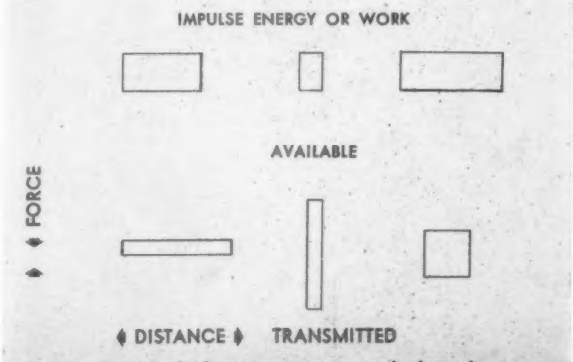


Fig. 11—Energy before impact vs. work done by impact.

by **Paul Van Sittert**
Chief Development Engineer
The Rotor Tool Company

When tightening threaded fastenings with power tools, consideration has to be given to the types of fasteners being driven and the types of tools available for the job. In the first part of this two-part article, we discussed some of the various fastener types and the action of the fastener when it is tightened. In this concluding part, we will discuss different types of drivers designed for use on the assembly line.

STALL TORQUE DRIVERS

Probably the simplest power tool for driving threaded fastenings is a pneumatic motor arranged with suitable gear ratio and spindle to fit a socket. The fastener is revolved by the tool unit until its resistance exceeds the torque supplied to it by the motor. At this point the motor stalls. The proper degree of tightness of the fastener is controlled by the air pressure supplied to the air motor. For this purpose a pressure regulator is required. It must be of a type which will not permit the pressure to build up when the air flow is greatly diminished.

In this type of driver, the air pressure in the motor, when stalled, is dependent largely on the leakage of "blow by" which, in turn, depends upon blade action. For this reason, particular care must be directed to the mechanical condition of the motor and its vanes, and to the air which is supplied. Air filters should be installed in the line to remove any dirt particles which might cause the vanes to stick. Air line lubricators should be employed to guarantee a mist of oil entrained in the air stream to obtain optimum blade action.

The principal advantage of this arrangement is its simplicity. When used continuously on the same job, with uniform fasteners, it produces fairly uniform results. Wear of parts is small. Occasional filling of the oil reservoir and checking of the regulated air pressure and infrequent servicing of the

continued

motor is all that is required to keep this unit in operation.

The revolving parts in the motor may have considerable momentum, or flywheel action, which will produce much greater tightness in the fastening which stops abruptly than in one which stops gradually. The rotor is the most critical item since its speed is the greatest, although the gears and spindle and even the socket contribute to the momentum, especially if the spindle speed is high. Unless the tool is mounted on a torque balancer, or two or more units are mounted in a multiple fixture, the operators may complain about torque reaction. When the motor stalls, the operator must hold the full load unless mechanical provisions are made to absorb this force. Another dilemma which has not yet been solved for this type of driver is that a large gear ratio is frequently necessary to produce the required driving torque. If the running speed is too slow, the operation will be too expensive since too much time will be consumed in spinning the nut down through the approximately ten revolutions which it ordinarily requires.

If a large motor is used to obtain both a high running speed and a large stall torque, it must be capable of considerable horsepower. Consequently, its air consumption will be large. In plants where many driving operations are performed simultaneously, this may represent a heavy burden on compressor capacity and on pipe lines.

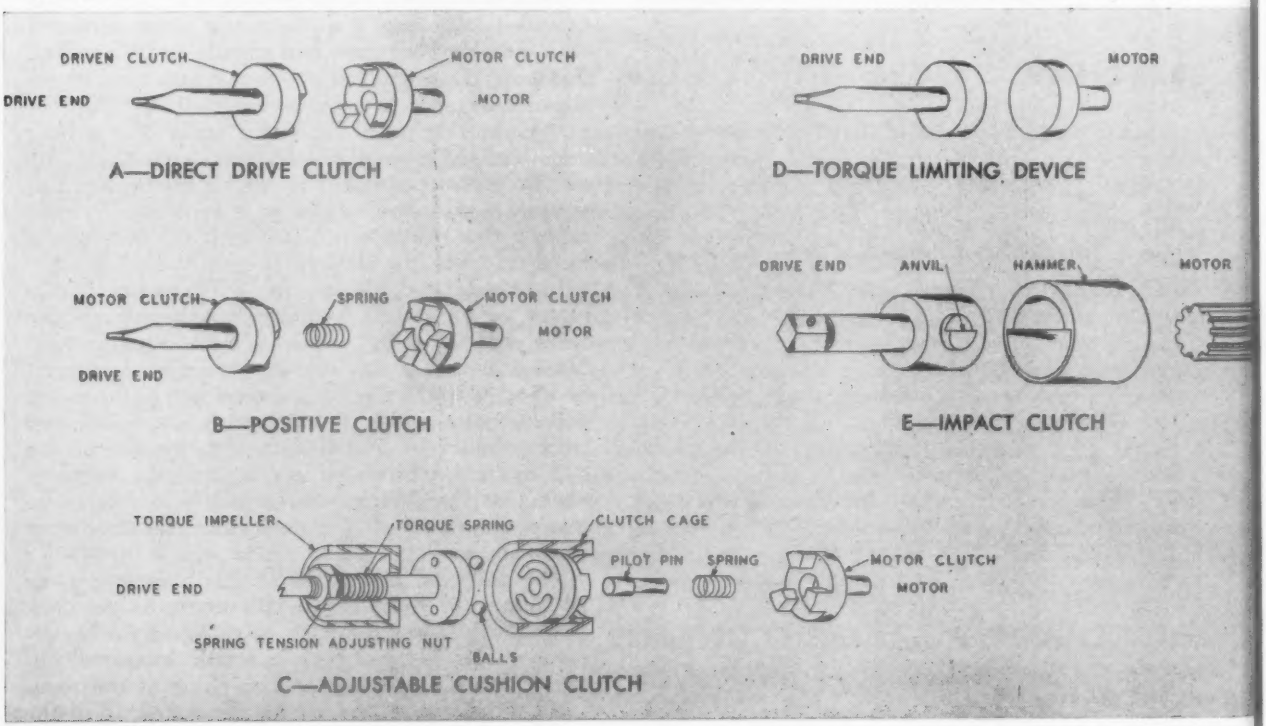
With the growing use of automatic type equipment in industry, there is an increasing trend toward multiple units. These comprise a bank of power tools held in a fixture and arranged so that a whole group of fasteners can be driven simultaneously. The stall torque drive is very popular for this purpose. The advantages and disadvantages of the stall torque driver apply equally to the multiple units, except that torque reaction is absent in this arrangement. The problem of an adequate air supply becomes more important.

IMPACT WRENCHES

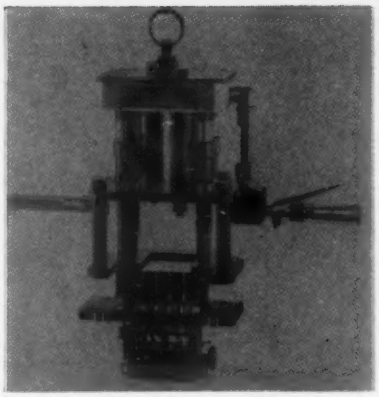
During the past 25 years, the use of rotary impact wrenches has grown rapidly. In view of this, it is surprising that the principles of their operation are not better understood. With these tools, a series of rotary impacts or impulses are delivered to the work. These impacts are separated from each other by time intervals during which the motor accumulates momentum to deliver the next impulse. By this process, the motor is able to amplify its apparent output and produce very substantial torque.

The ratio between the time interval during which the motor accumulates energy and the very short period during which it delivers this energy is a rough index of the torque amplification. Thus, the

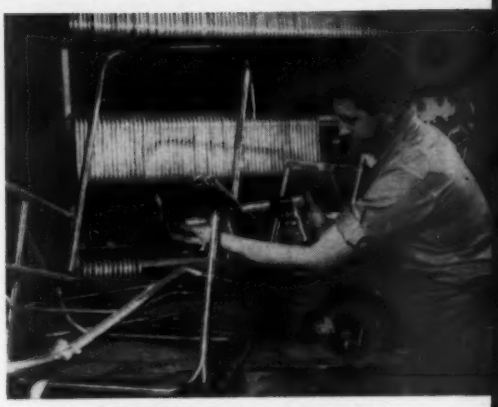
Exploded views of power tools for tightening fasteners. A: disengaging type of direct-drive clutch shown can be direct-coupled; with non-disengaging type operator absorbs stall reaction. B: with positive clutch, tightness of fastener is determined by time and pressure as applied by operator. C: adjustable cushion clutch sets fastener to tightness determined by spring and impeller and speed of ball clutch motor; some designs may have dog clutch. D: with torque limiting device, design may shut off air to motor or incorporate shear pin theory. E: with impact clutch, tightness is accomplished by accumulating impacts of hammer and anvil as hammer is rotated by motor.



Here a pistol-type impact wrench is used to tighten bolts in large gear component.



Multiple screwdriver speeds the assembly of radios of type shown under the drivers.



Cushion clutch driver is used here in assembly of tubular frames for aluminum chairs.

same effect as that of a train of gears can be obtained without the use of the gears and without loss of running speed.

Some provision is usually made so that on free-running fastenings the nut spins down before impacting begins. When the resistance of the fastening becomes large enough to cause impacting, a series of impulses is delivered by the wrench through the nut socket. Thus the fastening is advanced a small amount by each impulse until this accumulated effect produces the desired tightness.

This action is illustrated in Figure 10. The upper curve shows the maximum output of the particular wrench on a specific fastening. When the impacting begins, tightness of the fastener increases rapidly in its initial stage. As it gets tighter, the rate of increase diminishes to a point where no additional tightening will be accomplished. The approximate position at which the slope of this curve changes most rapidly is referred to as the "knee" of the curve.

The lower curves indicate the operation of the same wrench on the same fastener, but with reduced air pressure. If accurate control of the tightness of the fastener is essential, it is imperative that impact be continued beyond the knee of the curve.

One of the common misconceptions concerning impact wrenches deals with the "force of the blow." Attempting to describe an impulse or an impact in terms of force is like trying to measure the weight of an object in inches. It is true that we can derive the weight of an object from its length, breadth and height, provided we also know its density. It is also true that we can determine the energy available for an impulse or an impact if we know the weight of the moving member and its speed.

The energy available is proportional to the first power of the weight times the square of its speed. The energy available can also be expressed in terms of work. Work in turn can be expressed in terms of force and distance. Hence, we can establish a relationship between the energy available before impact (minus losses occurring in transmission) and the work done by the impact, provided we measure these quantities in the proper units.

This situation is illustrated graphically in Figure 11. The upper series of rectangles represents the energy available for a series of impulses. These are not necessarily of equal size. In the operation of an impact wrench, the weight of the moving part is the same for each of a series of blows, but the speed of the parts, just prior to impact, may differ considerably between one blow and the next. Hence, we may think of the energy available in terms of the area of these rectangles. The lower series of rectangles indicates the work transmitted after transmission losses have been deducted. In each case, the height of the rectangle represents the average force generated during the impact, and the length of the rectangle indicates the distance moved. Thus, for impulses of equal magnitude, we could have a small force operating through a long distance, or a greater force if the travel were shorter. We can now see the reason for the "knee" on the curves illustrated in Figure 10. When the tightness has increased sufficiently, the distance the fastener is advanced by each impulse is reduced proportionately. If this process is continued, the distance diminishes to that of the elastic deformation of the parts, so that the entire impulse can be absorbed elastically without any further increase in tightness.

This also helps explain why the same wrench, operating on the same air pressure, can produce high torques on one job in a given time and much lower torques on a different job in the same length of time. Torque values will always be lower on soft jobs than on hard jobs when all other conditions remain the same. Also, if the same wrench is applied to a series of fasteners of increasing size, for the same time intervals, it will be found that the tightness increases with the size of the fastener. Similarily, if the structure in which the fasteners are assembled is flexible, the tightness will be less than if the same fasteners were driven in a more rigid structure by the same tool for the same time interval, at the same air pressure.

This same effect is evident in varying degrees where considerable looseness is present between the nut socket and the bolt head, or where socket adapters or universal joints or spindle extensions are employed.

continued

The effect of reducing the air pressure supplied to the motor of an impact wrench is primarily to cut down the amount of energy that can be accumulated by the motor between impacts. This is the principal reason for the appearance of the lower curve in Figure 10.

In some impact wrenches, excessive variation in air pressure may disturb the synchronization of the motor and clutch units. This is particularly true of those in which the engagement and disengagement of the clutch parts is controlled by centrifugal force, or where some spring or elastic member is interposed between the motor and the clutch to accelerate the hammer portion of the clutch.

Several advantages accrue from the use of impact wrenches. The most important is their relatively small size and weight for a given capacity. By no other means can such a high torque be achieved with such a small driver. The next and most important advantage is the almost complete absence of torque reaction. An operator can easily hold in one hand a wrench capable of tightening a ⅜ in. bolt, without danger of the wrench twisting out of his grasp.

Torque reaction is slightly more pronounced in those models where gearing is interposed between the motor and clutch unit. This is partially compensated for by the elastic drive usually employed in these designs. In the direct drive types, the torque reaction results solely from the air pressure built up in the motor between impacts. The operator is usually able to guide and control the tool with a minimum of vibration.

The third advantage of impact wrenches is their relatively small air consumption. This results from the fact that they can combine a relatively high spindle speed for running the nut down rapidly with a high output torque after impacting has begun. Where a considerable number of drivers is used in the same assembly area, this represents a substantial savings in air line capacity and in compressors.

Important as these advantages are, impact wrenches are not without some disadvantages. Control of the tightness of the fastener depends almost entirely upon the skill of the operator. As mentioned earlier and illustrated in Figure 10, control of tightness during the early stages of driving requires split second timing on the part of the operator. If the wrench is adjusted by regulating the air pressure or otherwise, so as to carry the job beyond the knee of the curve, accuracy of control improves considerably, but only at the expense of driving time. This procedure may make the operation too slow and costly or may prevent the operator from keeping pace with the assembly line. This is a difficulty encountered with some impact wrenches designed to automatically control the torque of the fastener.

Another disadvantage is that impact wrenches have a relatively high maintenance cost. Despite the use of the finest materials, workmanship and heat treatment, and that designs have materially improved since the invention of the impact wrench, the nature of the service is so severe that such punishment cannot be tolerated indefinitely by any known materials. The struggle to do bigger and bigger jobs with smaller tools only aggravates this situation.

Allied closely with the wear of parts is the problem of timing referred to briefly before. During certain phases of the driving operation, the impacting surfaces of the clutch teeth sometimes mesh with less than their full bearing surface. This is most likely to occur when the clutch mechanism and the motor are not synchronized. This lack of coordination may be due to the line pressure deviating widely from normal. It may be caused by using the wrench beyond its rated capacity, or by other conditions not anticipated by the designer of the tool at the time of its development. The net result is that the corners of the impact teeth are "nibbled" or eroded away to produce a rounded surface. When this happens, the wrench loses its power and worn parts must be replaced.

The impact wrenches as well as the stall torque drivers, described thus far, are driven by compressed air. There are now on the market a number of impact wrenches which are driven by electric motors. All of these contain gearing between the motor and clutch assembly, and have some yielding connection between the drive and the clutch to cushion the shock. Even so, the speed fluctuations resulting from impacting cause considerable current surge through the windings of the motor so that maintenance of these motors may be more expensive than air motors in the same class of service.

POSITIVE CLUTCH DRIVERS

A modification of the stall torque motor which increases its usefulness is what is termed a positive clutch. In this clutch, as distingiushed from a direct drive clutch, the tooth faces are sloped slightly so that the torque transmitted through the clutch teeth is dependent upon the thrust exerted by the operator. When the resistance offered by the fastener exceeds the torque transmitted through the clutch under a given amount of push by the operator, the clutch disengages by moving the entire tool back in the direction of the operator.

This arrangement provides the operator with two distinct advantages over a direct drive motor. First, since the spindle does not revolve until the tool is pushed against the work, it is much easier for the operator to find the slot or hex of the fastener being driven. Second, the operator can regulate the torque transmitted by varying the push against the tool so as to suit the needs of the fastener. For example, with some sheet metal screws, the torque required to initiate the breakthrough of the threads exceeds the torque required for rundown and final setting of the head. By pushing hard on the tool at the beginning, the operator can furnish more torque at this point where it is needed. By easing up after the thread has broken through, he can permit the clutch

continued

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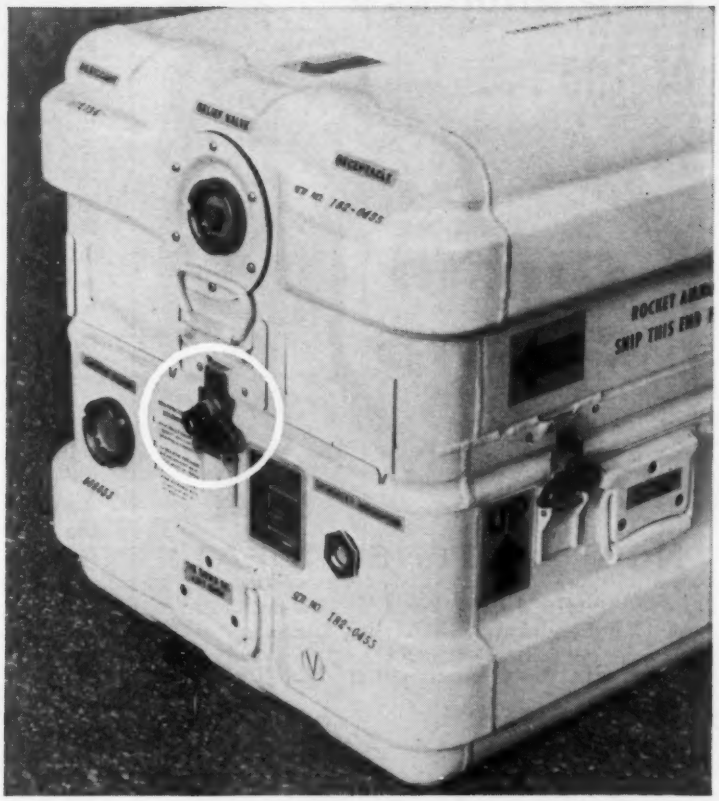

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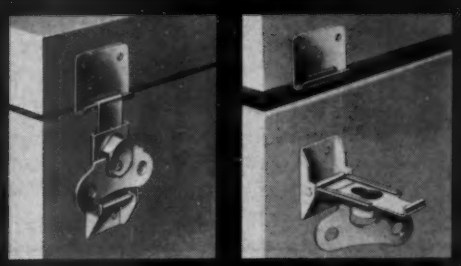

Half-turn applies high closing pressure, counter-turn disengages for opening. LINK-LOCK lies flat open or closed.

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to disengage when the head tightens without danger of twisting it off.

It is important that the operator shut off the motor or remove the tool from the work as soon as the clutch disengages. If the tool is permitted to run with the clutch alternately engaging and disengaging, rapid deterioration of the clutch tooth surface will ensue. Also, since the entire weight of the tool must be raised to permit disengagement of the clutch faces, severe impacting takes place when the tool continues to rap. This will probably strip the threads or break off the fastener.

Positive clutch drivers are particularly suitable for and find their greatest use in connection with the driving of sheet metal screws, self-tapping screws, wood screws, and certain types of self-locking fasteners.

CUSHION CLUTCH DRIVERS

Another driver which has gained wide popularity is that known as a cushion clutch tool. In this design, spring pressure is used to hold the clutch members in engagement so that the driving torque transmitted is independent of the push provided by the operator. The resulting combination contains features of operation similar to several devices previously described. The motor unit behaves like a stall torque driver until the clutch disengages, with spring pressure holding the clutch members together. It retains most of the advantages of the positive clutch driver, except that the operator cannot control the transmitted torque by changing the thrust against the tool.

Since the members comprising the clutch contain a certain amount of weight and they must move to permit disengagement of the clutch, an action similar somewhat to that developed in an impact wrench takes place when the clutch disengages. Advantage is sometimes taken of this feature to increase the output torque of the driver by purposely increasing the weight of some of these parts.

Careful selection of the various factors comprising a cushion clutch driver is essential to assure satisfactory performance on the job. Possibly the first factor to consider is the spindle speed. If the spindle runs too fast it will be impossible for the operator to fully engage the clutch teeth, with the result that these parts will wear rapidly. At 1000 rpm, full engagement is relatively simple; at speeds higher than 2000 rpm, it is almost impossible. At intermediate speeds, the difficulty of obtaining full engagement lies between these extremes. On the other hand, the slower the spindle speed the greater the torque available from the motor because of the mechanical advantage afforded by the gearing. This torque should always exceed that required to disengage the clutch.

The next factor is selecting the proper spring to hold the clutch in engagement. This spring pressure determines what we might term the "manual kick-out torque" of the clutch assembly. Springs requiring more such torque than the motor is able to

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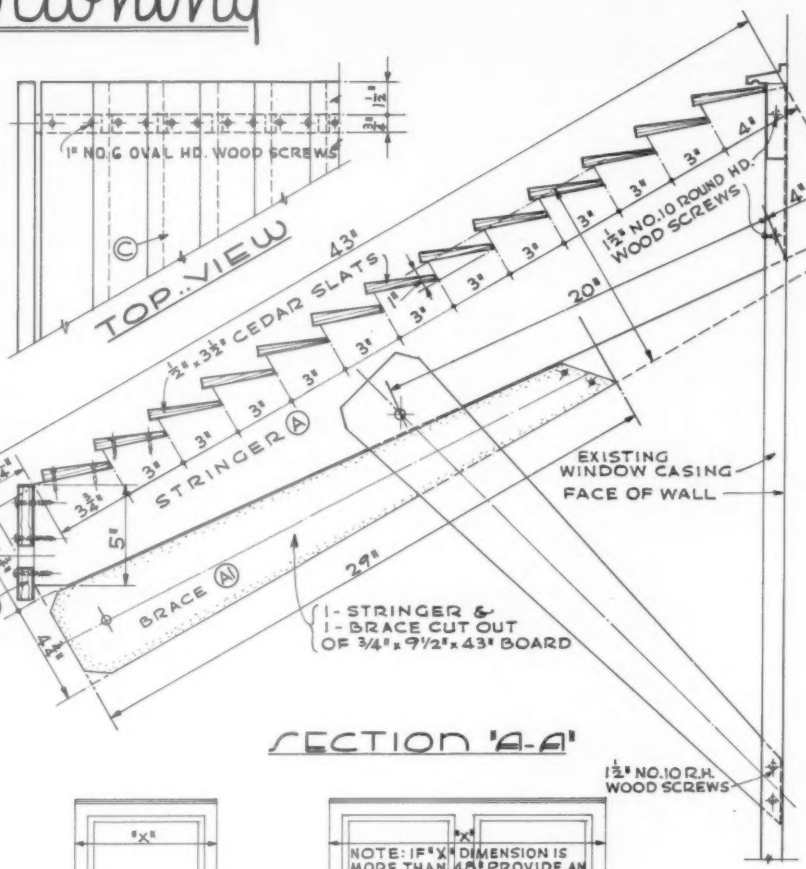

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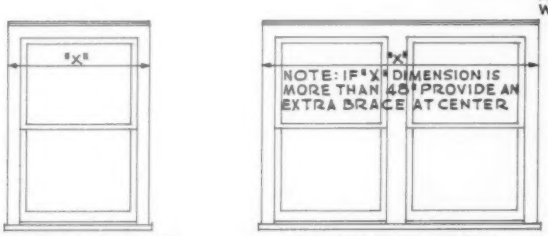

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furnish at the selected spindle speed should be avoided.

The manual kick-out torque of the clutch assembly normally acts as a kind of ceiling to limit the torque output from the motor.

If it is desired to boost the output of the driver by superimposing some impact onto the kick-out torque of the clutch at the expense of uniformity of torque control, it can be done. The two factors which control this impact effect are the spindle speed and the weight of the impeller or corresponding part which must move to permit disengagement of the clutch. The higher the spindle speed, the greater the impacting effect; and the heavier the impeller, the greater the impacting effect.

Care should be taken to avoid using a heavy impeller with a light spring, especially when the spindle speed is high. Under these circumstances the spring will be unable to return the impeller to its original position in time for the next disengagement. The operation of the clutch will be rough and its performance will be erratic.

As with stall torque drivers and impact wrenches, the hardness or softness of the job exerts a modifying influence on the results when using a cushion clutch driver. On metal--to-metal jobs, where some impacting effect is desired to increase the nut tightness beyond that normally obtainable, it is sometimes possible to combine a high spindle speed with a strong clutch spring, and a heavy impeller to obtain this result. This is a dangerous business.

If some fasteners are encountered which behave like a soft job, the motor may have insufficient torque to disengage the clutch and will stall. Such stalling imposes a severe jerk on the operator because he is subject not only to the stall torque of the motor with its reduction gearing, but also to the flywheel effect of the revolving parts.

If all the fastenings driven were to behave like a hard job, this same flywheel effect would carry the motor over its peak load to disengage the clutch and render this arrangement feasible.

TORQUE LIMITING DRIVERS

In comparatively recent years a number of drivers have been developed which can best be described as torque limiting devices. The first one to appear was a rather cumbersome unit in which the motor drove the nut socket through a differential, the other arm of which was connected to a torque wrench. When the reading on this torque wrench reached a predetermined value it tripped a switch which shut off the electric motor.

Another company developed a torque limiting driver which was usually mounted on a drill press or other stationary source of rotation, although a few units were tried on portable tools. The operation of this torque limiter was generally similar to that of a conventional cushion clutch except that after the clutch had disengaged a friction device prevented reengagement until all torque was removed.

Since then, numerous manufacturers have offered torque limiting devices for use as attachments to, or designed integrally with, portable tools. In some

continued

of these units, control of the desired torque is obtained by adjusting a spring. In others, the position of permanent magnets is used to obtain this adjustment. In most of these devices the drive is uncoupled when the predetermined torque is reached so that the motor is permitted to run free. In other designs, the motor is stopped automatically when the predetermined torque is reached.

Pressure does not affect the results. Since the disengagement is mechanical in most cases, the momentum or flywheel effect of the revolving motor parts does not cause undue variations. On the other hand, none of these devices has achieved too much popularity because they fail to do the thing wanted most—that is to produce a uniform tightness regardless of the hardness or the softness of the job.

The demand for such a tool still exists, and the manufacturer who solves this riddle will find a large and ready market for his products.

SUMMARY

In conclusion, we have seen that most fasteners yield better service if they are tightened so as to produce a tension in the fastener somewhat less than their yield strength.

Torque is a rather poor yardstick for measuring bolt tension, but is the most convenient method available at the present time.

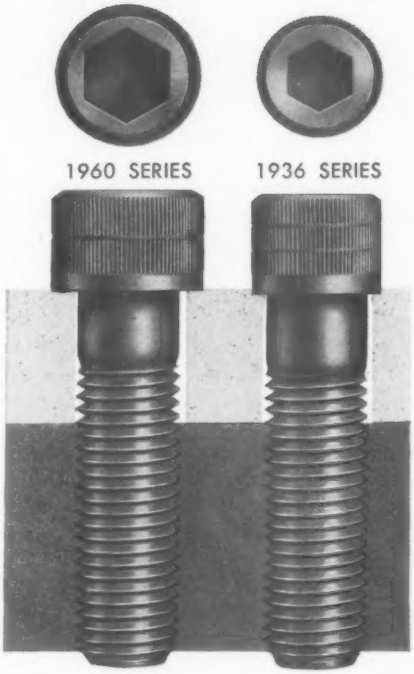
Adequate instruments for torque measurement are available.

Several types of power drivers can be used in the application of threaded fasteners: stall torque drivers, impact wrenches, positive clutch drivers, cushion clutch drivers, and torque limiting drivers.

These drivers exhibit different behavior on different jobs. Soft jobs usually show lower torque values than metal-to-metal jobs under otherwise identical conditions. For uniformity of tightness of fasteners, the impact effect should be avoided or minimized.

To obtain the best results, the proper driver should be selected according to the nature of service it is to perform. •

Allen's *New '60 Series* Socket Head Cap Screws



give up to 2⅓ times more load carrying capacity ...without indentation!

In Allen's new '60 Series, head diameter of sizes from ¼" up is now uniformly one and one-half times the body diameter. In many sizes (where this ratio was not called for by 1936 Series specifications) this will provide *more* under-the-head bearing surface, and a proportionate *increase* in clamping force. Loads are more evenly distributed, and the greater bearing area in many cases eliminates need for washers.

Socket sizes have been increased in many cases—greater wrenching area permits higher tightening torque—which resists fatigue failure, and lengthens the life of the threaded joint.

- A new 2-band knurl will identify all ALLEN Cap Screws (except Stainless Steel) that conform to the new '60 Series specifications. New labels on boxes will also identify these.
- The 1936 Series of Allen Cap Screws will continue to be available.

COMPARISON OF ALLEN 1960 SERIES AND 1936 SERIES SOCKET HEAD CAP SCREWS

SCREW SIZE	HEAD DIAMETER Minimum (Inches)		BEARING SURFACE Minimum (square inches)		PERCENT OF INCREASE IN BEARING SURFACE[1]	TENSILE LOAD TO INDENT IN SOFT STEEL[2] (lbs.)		TORQUE INDUCED TENSILE LOAD TO INDENT IN SOFT STEEL[2] (lbs.)	
	1960 Series	1936 Series	1960 Series	1936 Series		1960 Series	1936 Series	1960 Series	1936 Series
¼	.365	.367	.044	.044	—	4,750	4,750	2,780	2,780
5/16	.457	.429	.070	.052	33	7,440	5,600	4,380	3,300
⅜	.550	.553	.111	.111	—	12,100	12,100	7,000	7,000
7/16	.642	.615	.140	.103	36	15,000	11,000	8,850	6,450
½	.735	.739	.183	.183	—	19,500	19,500	11,500	11,500
9/16	.921	.863	.293	.216	35	31,000	23,200	18,500	13,600
⅝	1.107	.987	.424	.224	89	45,000	24,000	26,700	14,100
¾	1.293	1.111	.585	.253	131	62,500	27,000	36,800	15,900
1	1.479	1.297	.768	.405	89	82,000	43,500	48,500	25,500

[1]Head tolerance revisions on Sizes #0 thru #10, ¼, 5/16, and ½ diameter have no significant effect on bearing surface or holding power of screws.
[2]Values based on .00025 inch indentation.

Ask your Industrial Distributor about ALLEN '60 Series Cap Screws. Write for samples and complete specifications. Ask for Bulletin G-25.

ALLEN MANUFACTURING COMPANY
Hartford 1, Connecticut, U.S.A.

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ALLEN HEX-SOCKET SCREWS HEAD

Use postpaid card. Circle No. 221

SPOT AUTOMATION SPEEDS

How one fabricator improved product quality while eliminating costly hand operations in spot welding, crimp fastening and bonding sub-assemblies

by **William D. Engstrand,** West Coast Editor

Fully automated, pushbutton-controlled assembly lines are as yet just a dream of the distant future. From the standpoint of automation, there is a vast chasm of difference between producing a single part to specified dimensions, then assembling a number of these automatically produced parts into a complex, useful, and sometimes operational product. The "human touch" is still needed in this latter operation. While it is conceivable that in the light of current scientific knowledge a fully automatic production line could be designed for simple products requiring a minimum of assembly operations, chances are the cost of such a line would be prohibitive.

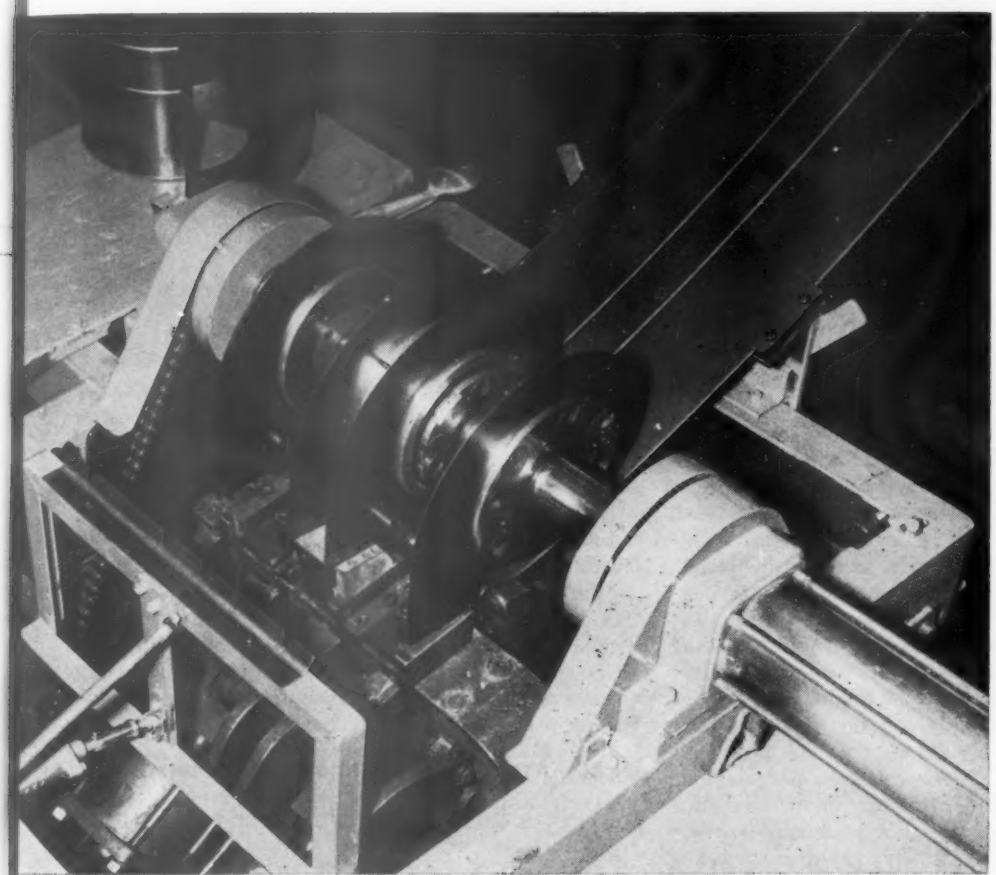
But this does not rule out what is now commonly termed "spot automation" along an assembly line. Spot automation is comparable to automatic production of unit parts in that a single, repetitive assembly operation is automated. Before and after the automated operation, assembly may proceed in the conventional manner. But a few such automated spots along any assembly line can often pay off in faster assembly at less cost, and often in better and more consistent product quality.

Some excellent examples of spot automation along the assembly line can be found in the plant of Trade-Wind Motorfans, Inc., Rivera, California, a major manufacturer of both commercial and home-type ventilating and air moving equipment. The company is a division of Robbins & Myers, Inc. Most of these products are essentially sheet metal assemblies incorporating operational units such as motors, fans, blowers, and electrical controls. In some cases, plastics are used instead of metals for operational components. Sheet metal assembly is generally accomplished both by spot welding and by the use of integral crimp-type fasteners.

Several years ago company engineers began to survey the assembly facilities and operations with an eye to spot automation where applicable. Repetitive fastening and assembly operations were singled out and given major attention. These fell in three major categories—spot welding, crimp fastening, and plastic component bonding. Because of the predominance of spot welding, this operation was given first attention.

It was obvious from the first that automatic spot welding would hinge upon the development of a machine which would jig and hold the component parts in perfect alignment, and which would incorporate enough electrodes or welding heads to

ASSEMBLY AT TRADE-WIND



1. An eight-electrode welder automatically jigs, roll forms and spot welds a dual blower scroll. The five components of one scroll are mounted in the machine. A finished model is visible at upper left.

perform the number of spot welds required before the assembly was removed from the jig. With this basic conception, design and development work was started.

The first job tackled was development of an automatic spot welder for a dual blower scroll component consisting of five blanked sheet metal parts. A finished blower scroll is partially visible in the upper left hand corner of Photo 1, with its component parts shown in the machine setup. It will be noted from this same photo that the cover plate of the dual blower scroll requires wrap-around forming during the assembly operation. This particular component was selected for automatic assembly largely because of the difficulty involved in jigging the five components in the usual manner, then welding them together on a conventional spot welder one spot at a time. Time requirement for the job as formerly done was also a factor.

The machine now in use for this job at Trade-Wind Motorfans is a custom-built, then radically modified Stryco resistance welder. It is tooled to jig, form and weld two different sizes of dual blower scrolls, and turn them out ready for incorporation in the final blower fan product. Aside from placing the component parts in the machine and pressing a few control buttons, the operation is entirely automatic.

Limit switches, timed contacts, and relays were used to automate the spot welder. Two aligned rows of four spotwelding electrodes each are employed. But the electrodes weld in paired sequence rather than accomplishing four welds simultaneously. This reduces current demand along with the size and original cost of the welder transformer. In brief, this is how the machine operates during one complete and automatic cycle in which a formed and welded dual blower scroll is produced.

continued

With the machine at "rest," the hydraulic cylinder shown protruding toward the lower right in the photo is retracted and the clamps which hold the four scroll plates are open. The operator first inserts the scroll plates in the positions shown, then presses a switch which closes the pneumatically-actuated clamps. This "jigs" the scroll plates firmly in position, with the two inner plates aligned to fit into the formed indentations or grooves in the cover plate, and with the two outside plates aligned with the edges of the cover plate. Next, one end of the flat blanked scroll wrapper or cover plate is shoved under the back of the scroll plates and between one of the rows of four spotwelding electrodes. Here the end of the scroll wrapper is clamped by another pneumatic clamp which holds it firmly in place. At this point the automatic cycle is started by pressing a switch.

The four aligned electrodes close upon the joint between the scroll plates and the inserted end of of the scroll wrapper and fasten them together by welding two spots at a time in sequence. Next, a hydraulically-actuated cam-action arm (not visible in the photo) rises beneath the free end of the scroll wrapper protruding from the machine and folds it up, over, and around the scroll plates. At the termination of this fold-over operation, the free end of the scroll wrapper inserts between the second row of four electrodes and against the now enclosed scroll plates. The four electrodes close upon the joint and, once again, complete the welding of the assembly two spots at a time. As the scroll plates are held in position by the pre-formed grooves in the scroll wrapper, intermediate welds between the two end welds are not required.

With the welding cycle completed, the machine shuts off automatically, the scroll wrapper clamps and the hydraulic cylinder clamps open, and the completely assembled dual blower scroll can be removed from the machine. The machine stops in a position so that it is ready for the next group of dual blower scroll plates.

CLOSER CONTROL OF REPETITIVE WORK

As pointed out by Trade-Wind Motorfan officials, comparative time figures show that automatic assembly of the dual blower scroll is many times faster than it could be accomplished by hand jigging and conventional spot welding. Product quality is also better due to machine control of the repetitive assembly operations.

Success with this original modified Stryco welder in an automated assembly operation has led to the development of a similar machine for spot welding sheet metal hoods. Here again the hood components are first accurately jigged in the machine by means of pneumatic clamps. The electrodes are then closed and the spot welds are accomplished in sequence, four at a time, once again to minimize current demand and transformer size and original cost.

2. A pneumatic machine inserts four hanger bars in the four corners of a heater housing in one setup. Formerly, bars were hammered under clips.

But spot automation on the assembly line at Trade-Wind Motorfans did not stop in the spot-welding department. At another place along one of the assembly lines four hangar bars had to be installed in pre-formed clips on the four corners of a heater housing. Originally these hangar bars had to be driven under the clips, one at a time, using a hammer or mallet. This required four repetitive hand operations on each heater housing.

PNEUMATIC DEVICE OBSOLETES HAMMER

To eliminate this assembly bottleneck, a pneumatically operated machine was designed which installs the four hangar bars in a single very simple setup operation. This machine is shown in use in Photo 2. The hanger bars, which are simply small L-shaped components, are held in four clips which are located so that they will feed the hangar bars, one at a time, directly into the pre-formed clips on the four corners of the heater housing. The heater housing itself is "jigged" by simply pressing it downward into a sliding holder between the two hangar bar feed clips mounted at each end of the machine.

When the operator actuates a foot switch, the heater housing moves one way and against two hangar bars protruding from their respective feed clips. This forces the leg of each hangar bar under the pre-formed clips on the heater housing. The housing holder then moves in the other direction forcing the remaining two hangar bars under the pre-formed clips on the other side of the housing. At the culmination of the operation, the housing holder centers and a pneumatically-actuated plunger rises beneath the housing to lift it from the holder.

3. Air-actuated clamps jig three components in place in this machine, which then crimp-clamps end sections to body of heater reflectors.

4. Plastic blower fans are assembled thus: components fit into a mold; quick-setting adhesive is applied; fans are transferred to joggle pressure clamps at top.

The only "setup" required is for the operator to pick up a heater housing, place it in the housing holder, then hold it down with a slight pressure while the hangar bar insertions are being made. The entire operation of installing four hangar bars with this automated setup requires less time than driving in a single hangar bar with a hammer.

A third automated assembly operation has to do with the assembly of heater reflectors. The machine designed to accomplish this job, and the three component parts of the reflector, are shown in Photo 3. The end plates are fastened to the heater reflector by means of integral crimp tabs on the end plates which slip through slots in the reflector body and are then crimped downward to hold the end plates in place.

ELIMINATE HAND-CRIMPING OF TABS

Despite the seeming simplicity of this assembly operation, it was a time-consuming job when accomplished by hand. The end plates had to be perfectly flat so that the crimp tabs would match with the slots in the reflector body. Then each of the crimp tabs, one at a time, had to be hammered over to hold the end plate in place.

The machine shown accepts the end plates between air-actuated clamps which are accurately spaced so that the crimp tabs will meet with the slots in the reflector body. The end plates need not be preflattened as the clamping pressure accomplishes this result. The reflector body is then jigged in the holder directly above the end plates. When a control is actuated, the reflector body is lowered over the end plates, the crimp tabs slip accurately through the slots provided for them, then the tabs are automatically crimped. Speed of the operation is limited only by the operator's ability to load the machine, and exceed by far the older handcrimping technique.

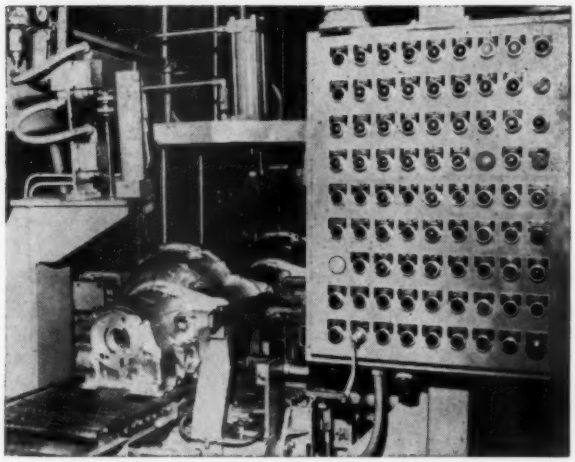
Another interesting installation along the Trade-Wind Motorfan assembly line is the setup employed to bond plastic blower fan components together. While this is not an automated operation in the usual sense of the word, it does provide speed of assembly and accuracy to the assembly operation. The setup now employed is shown in Photo 4.

FAST BONDING FOR PLASTIC BLOWER FANS

The plastic blower fan consists of five components —two shaft components and the three fan blades. The solvent employed to bond these components together is fast-acting, with only a few seconds required for setup. In assembling a fan, the operator smears the solvent on the joining surfaces of the components, then places them in the proper assembly sequence in the preform mold just in front. The solvent results in almost instantaneous bonding to the point where the blower fan can be lifted from the mold and placed under one of the joggle-operated clamps just above. Bonding of the components is completed by the time the operator has assembled three fans so that the first-assembled fan can be removed to make room for another.

In overall perspective, spot automation along the assembly lines at Trade-Wind Motorfans is working out very well as it concerns both production costs and product quality. Such success should inspire other companies manufacturing other products to take a long look at their assembly operations with an eye to automating if, where, and when automation is possible. •

Automatically-installed wire thread inserts facilitate maintenance and prolong the life of Ford converter housings



SIMPLIFIED TRANSMISSION ASSEMBLY

A new one-piece transmission converter housing, developed by the Ford Motor Company, has simplified transmission assembly and reduced the weight of certain model cars by almost 70 lbs. It is for use in the 265 hp and 300 hp Interceptor special V-8 engines.

Previously, these transmission housings were manufactured as two cast iron pieces weighing 46 lbs. and 43 lbs. respectively and required a bolted connection to assemble the pieces.

The manufacturing of a single-piece aluminum casting weighing only 21 lbs. required not only new handling equipment, but the development of new assembly techniques at Ford's Automatic Transmission Division in Sharonville, Ohio. Each aluminum housing has a machined starter mounting ring with three tapped holes to fasten the starter to the housing. During the life of the car, Ford engineers felt it would be necessary to occasionally remove the starter from the housing, and the need for threads

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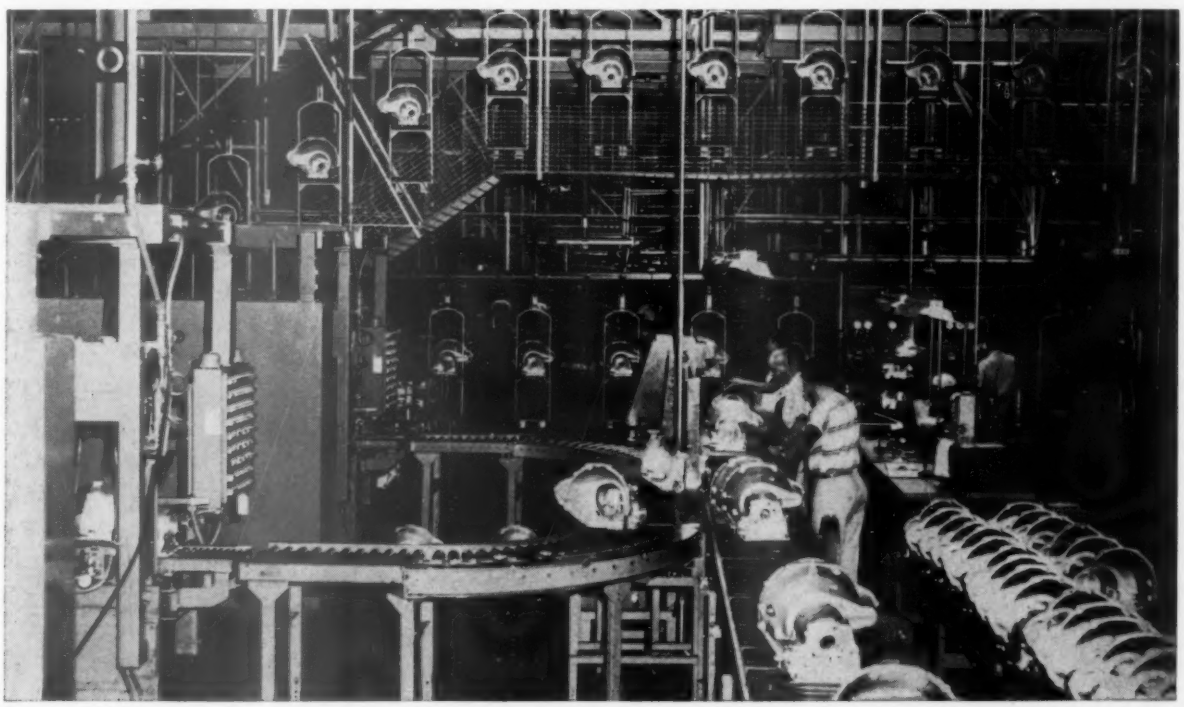
Housings now being conveyed to the inserting machine have been washed, pressure tested and inspected.



of higher loading strength and greater resistance to wear brought up a very important design consideration.

Accordingly, Ford engineers specified the installation of three 5/16-18 Heli-Coil wire thread inserts. Before specifying the use of these inserts, it was necessary to develop automatic inserting equipment for rates compatible with other assembly operations in the transmission plant.

After considerable development work, Heli-Coil engineers built a high-speed machine which automatically installs the wire thread inserts and breaks off the driving tang. The machine is equipped with two separate stations: one loads, aligns and simultaneously drives three inserts, while the second breaks the driving tang and catches the broken tang. Both units are part of a transfer line built by Majestic Tool.

HANDLE 120 HOUSINGS PER HOUR

The continuous machine is an integral part of an automatic line which drills and taps 105 different holes in each transmission housing. After pressure testing the castings are moved by roller conveyor to one of two machines from an inspection area. A central feeding station is used to divert the housings to the proper machine where they are automatically loaded onto a sequencing transfer-bar. The capacity of each inserting machine is 120 transmission housings per hour.

Installation of inserts is completely automated—from orienting and feeding the inserts to positioning and driving. Above each unit three individual hopper units are equipped with arms that rotate through the hopper pan loaded with inserts. The hopper has a capacity of 1500 inserts that are picked up at random and automatically oriented.

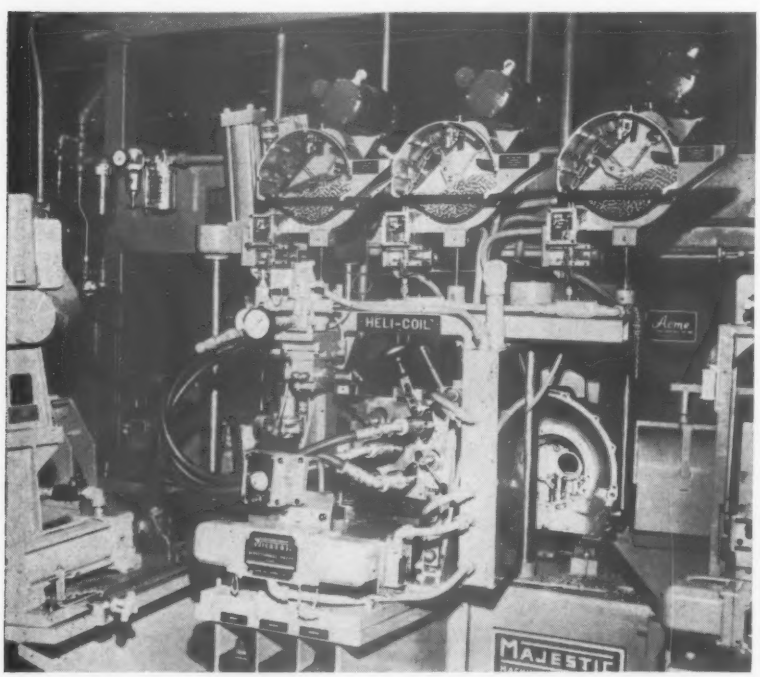
AUTOMATIC INSPECTION CHECK

Inserts are dropped from a reservoir to the inserting tool. An air jet increases the velocity of each insert as it slides through a nylon tube into the inserting tool. The insert is pre-wound and, as the tools move to the housing, it is screwed through a pre-winder tip into the transmission housing. After the inserts are installed, the carriage returns and a sweep mechanism cycles between the tool tips and the transmission housing on a routine and automatic inspection check.

The tang break-off station is equipped with three impact punches with a coil-retaining sleeve which supports the last coil of each insert at the time of impact.

A specially-shaped tang catcher is swung in back of each transmission housing by an air-actuated rack and pinion. After the tangs are broken off, the catcher returns to its original position. A trap door in the bottom of the catcher opens and the tangs are dumped into a disposal container.

The new lightweight transmission housing—a single piece sand casting weighing 21 lbs, versus two pieces weighing 46 lbs. and 43 lbs. respectively—are fitted as standard equipment in all 1959 Ford Fairlanes. •



Three 1500-capacity hoppers supply wire inserts which are simultaneously screwed into three tapped holes in a mounted ring holding the Ford starter in place. The machine handles 120 housings an hour.

Inserts fed to a hydraulic tool are installed through a pre-winder tip as the transfer carriage moves forward.

introducing the ALL NEW SIZE 834 impactool...

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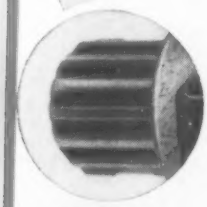
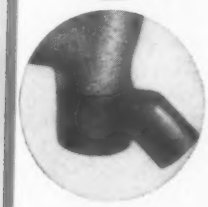
optional features



Spline Drive Anvil

For transmission of maximum power to the socket, many prefer the spline drive which is optional. The closer fit and greater driving area also provide increased socket life.



Swivel Inlet Assembly

Where extreme maneuverability is a problem, the optional swivel inlet assembly makes the hose easier to handle.

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Preferred by some operators, the optional inside trigger handle prevents the possibility of the operator's hand being caught when the tool is used in extremely close quarters.

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MOTOR Powerful new vane-type motor with direct drive to hammer provides greater torque and five times faster run-down. Motor housing is machined from a strong, lightweight alloy.

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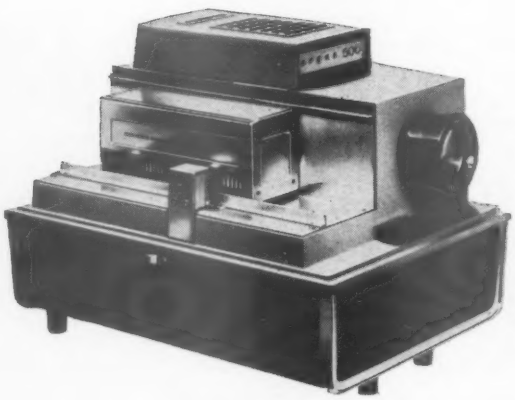
For the Argus slide projector case . . .

NEW FASTENING TECHNIQUE

Cases have a clean, compact look—thanks to channel extrusion "fastening"



by **Matt E. Hauertz,** Managing Editor

A new assembly technique has by-passed much of the cost inherent in the production of vinyl-metal carrying cases which would normally have been deep drawn. It also has permitted designers—in this case, Harley Earl Associates—a much wider latitude in adapting the popular "sheer look" to such cases. The process is called Aluma-Lok, and was developed by engineers at Arvin Industries, Inc., of Columbus, Indiana.

It resulted when Argus Cameras designed a new slide projector. They wanted the carrying case finished in Arvinyl because of the material's resistance to abrasion. Moreover, the case had to be made as economically as possible for the consumer market.

Normally, the parts for such cases would be deep drawn. Production of the bottom or base section in this manner would have called for a 2½-inch draw, while the top section or cover would call for a 5½-inch draw, well within the capabilities of the material. But two cost factors ruled out deep drawing. One was the cost of the deep draw dies; the other was the extra scrap resulting from trimming the drawn parts.

This led Arvin engineers to devise a new technique which is simplicity in itself. It requires only the use of bending equipment, producing virtually no scrap. Here is how it works.

The material used is 22 gage steel bonded on one side with vinyl 10 mils thick. The back side is

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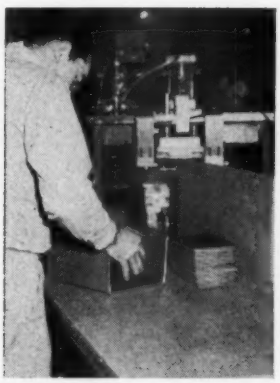
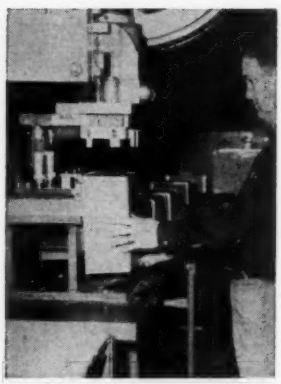
ELIMINATES DEEP DRAWING

Extruded channel-type edging is fitted on the sides of the vinyl-metal sheet that will form the wrap-around part of the base. Edging is then crimped.

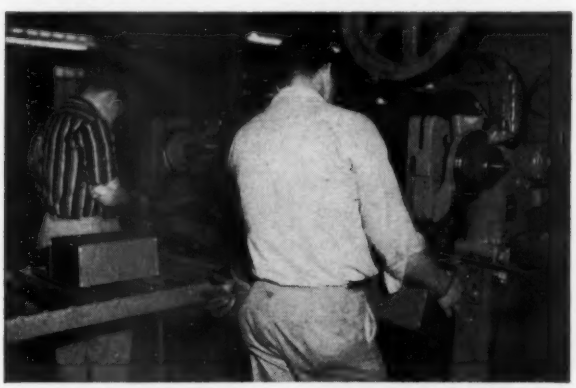


End pieces are inserted in grooves of channel edging in U-shaped cover.

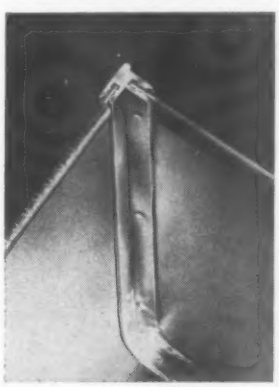


Edging is crimped and extruded thru holes in end-pieces to complete cover.

This bending fixture imparts U-shape to flat piece which will form the base for the projector case.

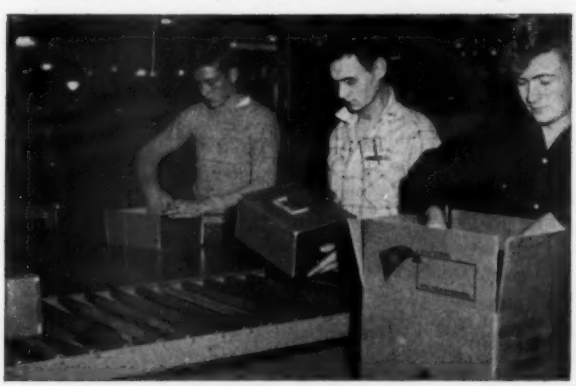


Drawbolt fastener brackets are riveted to the case. Work is conveyed to two riveting machines.



Sides and edging fit tightly in interior corners.

The extruded edging is unaffected by bending.



Finished projector-carrying cases are packed for shipment to the Argus plant.

painted while the material is still in the flat. Both lamination and fabrication are done by Arvin.

The vinyl-clad sheet that will form the wrap-around part of the cover is first fitted on the sides with extruded aluminum with minute horizontal serrations in both channels. This edging is then press-crimped onto the vinyl-metal. Next the U-shape is imparted to the sheet in a bending fixture. The extruded edging is not adversely affected by the bending operation.

USE EXTRUSIONS AS "FASTENING" DEVICE

The sides are then inserted into the channel grooves to complete the cover. These end-pieces have perforations along the edges so that when the assembled cover is placed in a crimping fixture, the aluminum edging is extruded into these holes to fasten the sides. This forms a compact and strong cover.

Similar operations are performed in the assembly of the case bottom which becomes an integral part of the slide projector upon final assembly at the Argus plant in Ann Arbor, Michigan.

The carrying case has two draw-bolt fasteners on opposite sides. The catches and snaps are fastened by riveting. The rubber feet as well as the diecast bosses on the projector chassis are attached to the base section by screws. Finally, a plastic handle is attached to the cover in such a way that no fastening method is noticeable from the top side. The aluminum part that holds the handle has four prongs which are simply inserted through a slot in the cover, then flattened.

According to R. P. Hooker, chief engineer of the Arvinyl division, the new vinyl-clad cases are produced at a lower cost than the previous pyroxylin-covered wood cases. So far, Arvin has used its Aluma-Lok technique in the production of thousands of these cases for Argus Cameras. •

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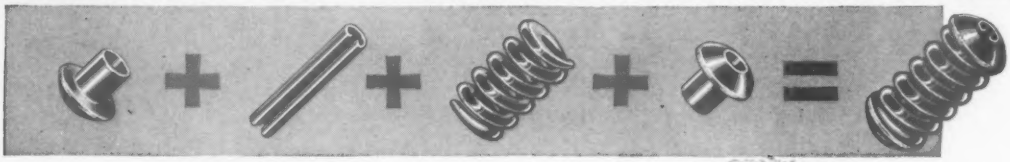

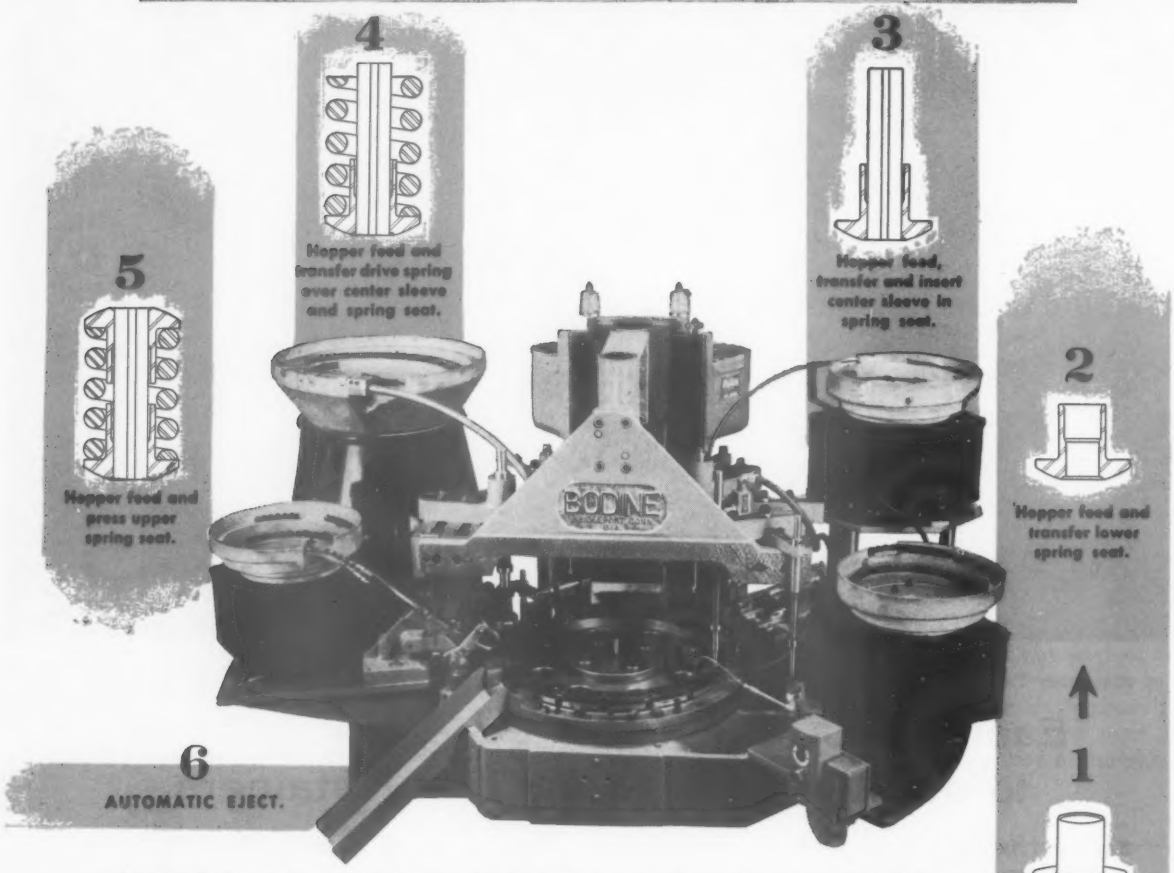

PRODUCTION: This high speed assembly job is automatically performed on a Bodine 42-30 dial type machine, equipped with four Syntron hopper feeds. It is specially tooled for assembly of a dampening spring for an automobile clutch plate.

All four components are hopper fed to position. Production is 40 assemblies per minute . . . automatically ejected.

Bodine engineers can solve your problems for repetitive production of small parts . . . milling, drilling, tapping or assembly, automatically . . . at low cost. Write Dept. AF-6.

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With Yesterday's Machine Tools

THE **Bodine** CORPORATION

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AUTOMATIC DIAL TYPE DRILLING, MILLING, TAPPING, AND SCREW INSERTING MACHINES

3BD52

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by **Fred McCarthy**
General Foreman
Cable Department
Raytheon Mfg. Co.

RADAR CABLE ASSEMBLY

Raytheon reports on "breakthrough" in the assembly of wire harness for air route surveillance radar equipment

Working from sectionalized blueprint glued to panel, cable makers lay in over 3000 feet of first-run wire. More than 30 different wires will be laid in by following a numerical code, then laced with wax-coated nylon knotted every half inch. Knots are lacquered to prevent slipping.

Laying in and lacing are followed by stripping, tinning, lugging and connector work, with steps performed horizontally. Raytheon engineers thought up idea of using hinged cutouts which become easy-to-work-at tables when folded down.

In making up cable harness for air route surveillance radar equipment at our plant in North Dighton, Massachusetts, production supervision found that the size and length of the cable presented a problem in handling and assembly.

First of all, finished cables were over 30 feet long. Into each went 32 different types of wire, including coaxial which is tough to handle because of necessary inner shielding. The first step is lacing (vertical working position) which was easy enough. Trouble arose when this step was completed, and it was necessary to transfer the harness to flat tables measuring 10 feet square. Here a horizontal working

continued

On same panel, lugging and stripping operations are done. Insulation is stripped to standard ¾-inch length preparatory to tinning and soldering. Lugs are metal, solderless type, and are used with terminals on cable.

Radar Wire Harness Assembly, continued

position was required so that soldering and other operations could be performed.

In moving the harness from table to table, the cable became frayed at the edges. This problem was overcome by converting the original vertical panel board into a combination horizontal setup without removing the cable.

This was done by securing the cable board to slotted iron A-frames. Carpenters were then called in to cut out sections of the board. These cutouts were hinged at the top; folding legs were added. When the cutout sections were swung out, the legs dropped down. What was vertical became horizontal —all on the same master panel.

The new arrangement makes it possible to perform such subsequent operations as stripping, tinning, terminal connector work, and continuity check without moving to another spot.

This new method has resulted in: (1) ease of operation, (2) saving of space, (3) eliminated extra handling, (4) increased efficiency, and (5) savings in production cost.

We also eliminated the need for extra 10 foot benches (costing $150 each), plus the extra labor required to carry the cable to the tables. Cost of converting the original panels amounted to only $18.80 for all six hinged tables. Estimated savings of approximately $75 per cable have thus been effected.

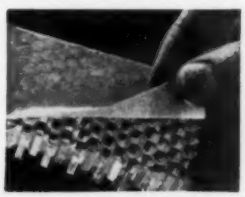
Foreman explains a step to connector assembler. Her working tools are open-end wrenches, razor knife, lugging pliers, file, and vise. Other girl operates gun-type electric solderer. Nails hold cable on board. To prevent fraying, nail heads are covered with masking tape which is also used around cutout tables to prevent tearing of blueprint.

THREAD-THIN contact is all that's required to bond the open end of the thimble. The adhesive used here holds fast at over 5000 psi in overlap shear (aluminum-aluminum); makes load-bearing honeycomb sandwich structures practical.

FROM 3M RESEARCH

Adhesives that meet bonding problems "edge on"

3M research-developed adhesives can hold over 600 pounds on the rim of a thimble. Industry is putting this strength to work in hundreds of ways.



AIRCRAFT WINGS, for example, are being built of lighter, far stronger honeycomb sandwich structures, thanks to 3M Composite Film Adhesives. These dry adhesive films turn liquid, then cure under bonding heat. Their remarkably high peel strength holds wing skin and core intact for the life of the plane.

THESE SAME WINGS are coated with other 3M products—erosion-resistant coatings. They protect the leading edges from the destructive blast of rain and dust at supersonic speeds.

3M SEALERS help make fuel tanks leakproof. They do this vital job in spite of extreme vibration, structural flexing, thermal expansion and contraction of the sealed surfaces, rapid temperature changes.

SEE WHAT 3M Adhesives can do for you! For information and free literature, write: 3M, A. C. & S. Division, Department YW-69, 900 Bush Ave., St. Paul 6, Minnesota.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

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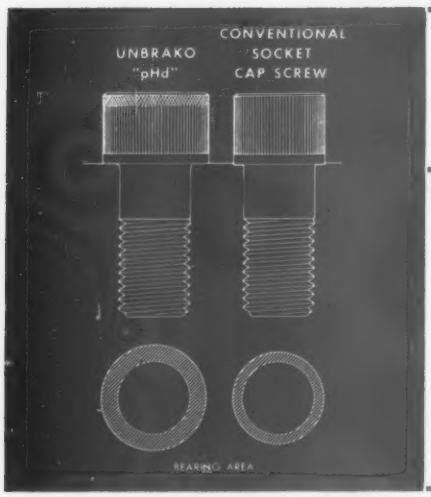
Larger head diameter of UNBRAKO pHd* socket cap screws increases load-carrying capacity up to 233%



*Proper Head Design—a factor in higher product reliability.

COMPARISON OF UNBRAKO pHd AND CONVENTIONAL DESIGN

Each size can now be utilized with equal reliability. The bearing stress is consistent from size to size in the new UNBRAKO pHd socket cap screws.

SCREW SIZE	HEAD DIAMETER (in.)		BEARING AREA (sq. in.)		LOAD TO INDENT IN CAST IRON (lb.)		% INCREASE USABLE STRENGTH	TIGHTENING TORQUE (lb.-in.)‡	
	Old	pHd	Old	pHd	Old	pHd		Old	pHd
¼	.375	.375	.041	.041	3,280	3,280	—	165	180
5/16	.438	.468	.047	.072	3,760	5,760	54	325	360
⅜	.562	.562	.102	.102	8,150	8,150	—	600	660
7/16	.625	.656	.116	.148	9,270	11,800	27	1,000	1,040
½	.750	.750	.188	.188	15,000	15,000	—	1,450	1,590
5/8	.875	.937	.203	.305	16,200	24,400	51	2,900	3,190
¾	1.000	1.125	.223	.432	17,800	34,600	94	5,050	5,600
⅞	1.125	1.312	.254	.594	20,300	47,500	134	8,000	8,900
1	1.312	1.500	.364	.785	29,100	62,800	116	10,550	13,600

‡Normal recommended seating torques for unplated screws, fine threads.

For you, pHd means sounder fastening, with resultant increases in product reliability at no increase in price. With pHd UNBRAKO socket cap screws you get stronger, more reliable joints; space and weight saving through use of smaller or fewer fasteners; greater fatigue resistance through application of consistently higher preloads; fewer fasteners working loose under vibration or shock; and elimination of washers under cap screw heads in many applications.

The principal reasons for the superior performance of broad-bearing pHd UNBRAKO socket cap screws are up to 233% more load-carrying capacity than with a conventional cap screw and the ability to be tightened tighter. Because of increased bearing area, the vital preload that keeps screws tight and prevents fatigue failures is distributed over more of the bolted material. Indentation under high working load is eliminated. And pHd UNBRAKO screws have been designed for high tightening. In many cases the socket has been enlarged for better key engagement. Combined with this feature is the fact that all the tightening force is used to preload the screw, in contrast with the conventional cap screw—where indentation saps some or all of the tightening force.

See your authorized SPS industrial distributor for complete details. Or write SPS—manufacturer of precision threaded industrial fasteners and allied products in many metals, including titanium. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 78, Pa.

SPS **Jenkintown • Pennsylvania**

Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Columbia Steel Equipment Co. • National Machine Products Co. • Nutt-Shel Co. • SPS Western • Standco Canada Ltd. • Unbrako Socket Screw Co., Ltd.

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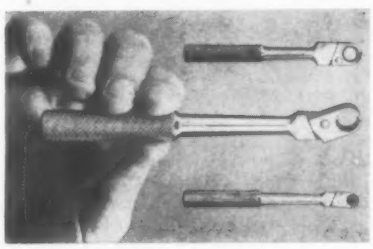
WHAT'S NEW IN EQUIPMENT

For information on any equipment listed here, use the postpaid card opposite page 56. Just circle the number on the card matching the number following the description. We'll do the rest.



(See 30)

SMALL RATCHET WRENCH FOR CLOSE-CLEARANCE JOBS

A small ratchet wrench is designed for close-clearance wrenching operations.

The outside diameter of the wrench head does not exceed the diameter of the head flange on a twelve point screw which means there is no overlap to interfere when bolting or nutting in tight places. A tool of the same type is also available for hex-head bolts and nuts. The tool can be used for either tightening or loosening.

Milbar Corp., 1900 Euclid Ave., Cleveland 15, Ohio.

Use postpaid card. Circle No. 30

(See 31)

(See 33)

PEDESTAL TORQUE TOOLS FOR BENCH ASSEMBLY

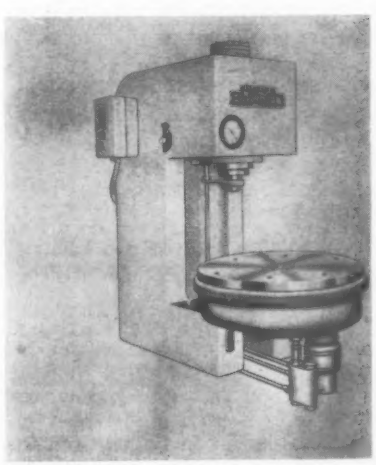
A line of pedestal type torque tools for bench assembly has been expanded. Work is applied directly to the tool which immediately indicates the correct torque during assembly of electrical and instrumentation units.

Mounted on the bench before the assembler, the tool is generally used with a work-holding fixture and the work is applied to the tool. Several models are available for measuring torque in inch-grams, inch-ounces, and in inch-pounds. The square drive accommodates fixtures of customer's design.

Included in the expanded line is the pedestal type Tiny Torque tool, measuring torque from 0 to 3, 6, 8 or 10 tenths of an inch-ounce.

Apco Mossberg Co., 1004 Lamb St., Attleboro, Massachusetts.

Use postpaid card. Circle No. 31



(See 34)

SOLUBLE SOLDERING FLUX FOR PRINTED CIRCUITRY

A flux for dip soldering printed circuit boards is designed for electronics applications requiring zero conductivity as well as non corrosive properties after soldering.

Catalog No. 14-E soldering flux is mildly acid at soldering temperatures, insuring good soldered joints, yet is completely soluble in water both before and after soldering, eliminating any conductive or corrosive residues. The flux will not penetrate the printed circuit boards. Sample boards soldered with this flux have met requirements of 70 meg ohm dialectric barrier.

Fusion Engineering, 17921 Roseland Ave., Cleveland, Ohio.

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HANDY METAL CASE FOR ALLEN WRENCHES

Hex-E-Case, an Allen wrench holder, prevents wrenches from falling out even when turned upside down. Complete visibility assures mechanic that no wrenches are missing.

Handy belt clip lets user carry case easily, and the keyhole slot allows case to be hung on a nail. The case is complete with 10 wrenches: GG-M-652 Class A short arm series, in a complete range of sizes that fit all socket head cap screws from No. 4 cap to ¾" set.

Hartwyk Mfg. Co., 360 Glenwood Ave., East Orange, N.J.

Use postpaid card. Circle No. 33

TWO TO EIGHT-TON ASSEMBLY PRESS LINE

A line of "E" series multipresses features a self-contained unit of "C" frame design. The Multipresses are claimed to provide greater tonnage per dollar and more daylight for wider tooling range, but in bench model size to conserve floor space and add unit mobility.

This new series of two to eight-ton capacity presses employs the factor that lower pressures properly applied on a given application often produce better quality products than a misapplied higher pressure. This is particularly suitable for assembly, crimping, forming, broaching, trimming.

The Multipress operates on 220 or 440 volts, 60 cycles, three phase current. The hydraulic system is a single power unit that can be removed and replaced in a few minutes for maintenance. Ram force, infinitely variable, ranges from 400 to 16,000 lbs., depending on the model.

Designed for manual or automatic production, the press can be tooled with

index tables, feed hoppers, stock feeds, and similar accessories.

Denison Engineering Division, American Brake Shoe Co., Columbus 16, Ohio.

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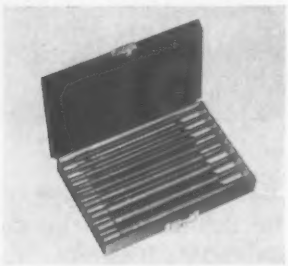
EIGHT-INCH EXTENSION FOR MACHINE, HAND TAPPING



Tap extensions for machine and hand tapping are designed to reach otherwise inaccessible holes.

The Style B 8" extensions range in sizes from No. 0-80 to ½"-20. They are also packaged in a set of nine tools.

The squared shank of the tap fits into a corresponding square in the socket of the extension. The tap, supported by the close-fitting long socket of the extension, is held in position by two set screws which bear on the square of the tap. The internal square in the extension transmits the necessary driving torque to the tap.

The Walton Co., Box 5, Elmwood Branch, Hartford 10, Conn.

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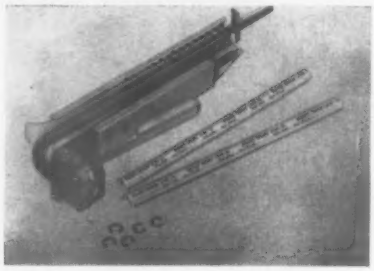
RETAINING RING TOOLS SPEED ASSEMBLY



Two retaining ring assembly tools have combined applicators and magazine-fed ring dispensers in one unit.

The Truarc "Ring-Gun" and "Ring-Jector", (photograph) are particularly suitable for ring applications in which the work piece is too large to be brought to a fixed assembly station.

The Ring-Gun is shaped like an oversized Luger pistol. It is loaded by removing a feeder guide and slipping a Rol-Pak of stacked rings over the back of the magazine rail. A spiral spring attached to the feeder pushes the rings forward to a recess in the applicator blade at the front of the tool.

The trigger is connected to an actuating lever located opposite the applicator blade. The lever has a tongue which corresponds in thickness to the width of the groove in which a ring is to be assembled.

The Ring-Jector resembles a hand stapler. It is recommended for assemblies where clearance dimensions prohibit placing a tool over the work piece in an axial direction or where smaller rings are used which do not require substantial force for spreading to clear the shaft.

Waldes Kohinoor, Inc., 47-16 Austel Pl., Long Island City 1, N.Y.

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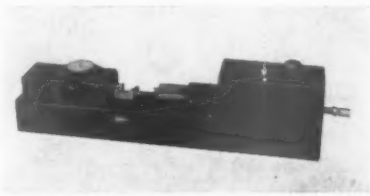
TENSILE TESTER CHECKS ELECTRICAL CONNECTIONS

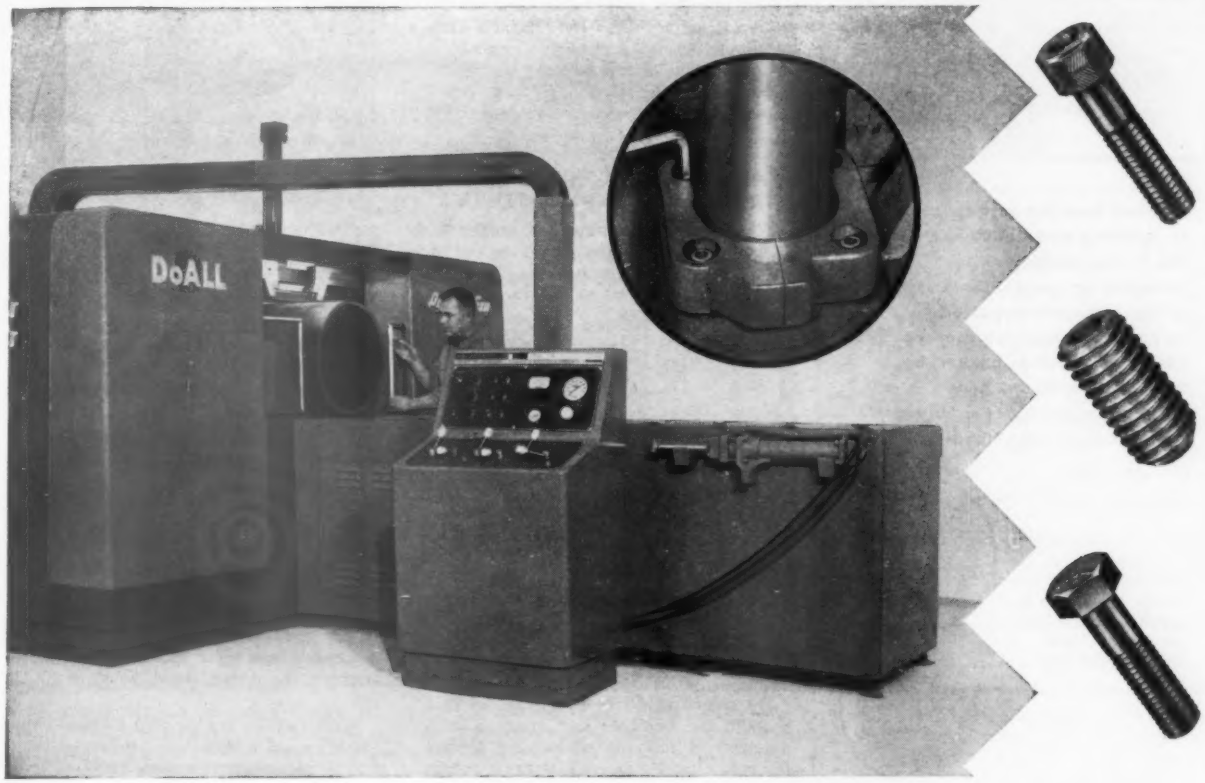
A portable instrument tests tensile strength of electrical connections.

The air actuated tester is built around direct-reading force gage mounted at one end of the tester base opposite the air cylinder.



In operation, the terminal is inserted in the appropriate notch in the gage's turret head. The head will accept standard wire sizes up to No. 12 primary cable inclusive and up to No. 10 heavy duty cable. The wire is placed between the open jaws facing the gage. The jaws close and lock automatically, and then pull the wire until the connector fails. The gage dial holds the force reading

IT PAYS TO STANDARDIZE ON **STANSCREW**



Stanscrew fasteners meet DoALL standards for high strength, rigidity, "clean" design

This outstanding machine was developed by the DoALL Company to handle industry's largest, toughest cut-off jobs. Not a beefed-up model of existing machines, this "biggest band saw built" is a unique new design. As one example, the cutting head travels vertically, but cutting takes place on the lower edge of the top saw band.

The new design of this unit, Model C24, therefore represents an entirely new concept of rigidity, applied power, and precision control. These basic considerations dictated the selection and application of every part . . . including, of course, the fasteners.

Small wonder, then, that DoALL's design engineers, after consultation with Stanscrew's fastener specialist, selected Stanscrew socket cap screws for vital applications such as attaching hydraulic cylinders. These reliable fasteners provide the high strength needed. Correctly applied, they give assurance against misalignment even after extensive use—a must in this precision machine. And, by permitting flush, snag-free surfaces, the fasteners also contribute to the C24's superior styling.

Like DoALL, other leaders of American industry are learning the advantages of calling in a Stanscrew specialist when a new product is on the drawing boards. His wide experience can often suggest ways to cut fastener or assembly costs . . . for example, by substituting a standard fastener for a costly special. He can make suggestions from Stanscrew's complete line of over 4,000 types and sizes, always in stock and quickly available.

So whatever your requirements in fasteners, call your Stanscrew distributor today. He will gladly arrange for a prompt visit from the Stanscrew fastener specialist.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

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at time of failure of the wire sample.

Seven models of the tester have maximum capacities between 20 and 500 lbs. Each has an accuracy of one-half of one percent of full scale.

Hunter Spring Co., 1 Spring Ave., Lansdale, Pennsylvania.

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SEALANT IN KIT FORM FOR DESIGN, EXPERIMENTS

Kit No. 1010 contains ten grades of Loctite sealant specially put to assist the engineer during the design stages of product development and for general experimental work.

By selecting different grades of this sealant, the designer can apply a predetermined amount of locking torque for retaining threaded fasteners; retain bearings and sleeves on shafts or in housings with any desired pushout strength; seal pipe and tubing joints against high pressure fluids. Kit contains ten bottles, each with an adequate working amount for making many tests. Also included is a jar of degreasing and activating solutions, as well as applicator swabs and complete directions.

American Sealants Co., 135 Woodbine St., Hartford, Conn.

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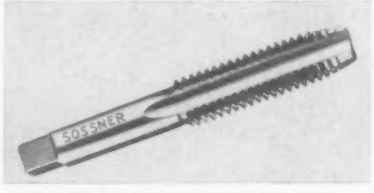
EXTRA HARDENED TAPS ARE SELF-LUBRICATING

A line of taps features "triple tempering" for increased resistance to chipping and breaking and is said to be self-lubricating.



The Electralube tap surface acts as its own lubricant which is embedded into the microscopic pores of the tap and is not subject to chipping or peeling. It is claimed that this lubricant takes over at the extreme points of cutting where regular lubrication must be supplemented, reducing the tendency for materials to stick to the cutting surfaces.

Sossner Tap & Tool Corp., 29 Broadway, Lynbrook, L.I., N.Y.

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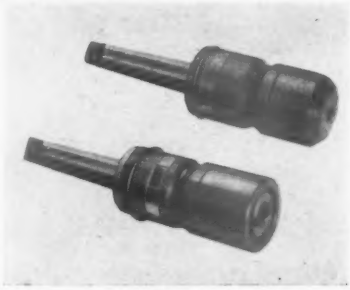
SELF-OPENING STUD DRIVERS ADDED TO CLUTCH LINE



Self-opening stud drivers have been added to the "Safe-Torque" line of automatic and preset clutches. The setters were formerly made by Jones & Lamson Machine Co.

The drivers have jaws that grip the stud and remain open until studs are fully seated in driving position. Take-down and reassembly require no special tools or fixtures, permitting interchange of jaws without disturbing stop collar settings.

Style B (left, in photo) accommodates studs from ⅛" to ⅞" in diameter and 15/32" to 2-11/16" in height. Style M incorporates a new clutch which disengages the outer sheet when stud is set.

Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

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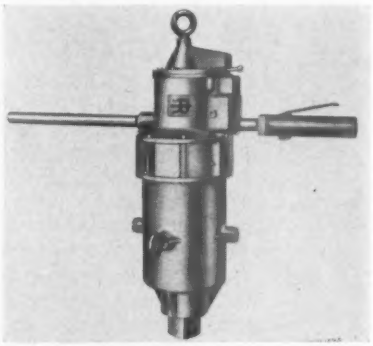
GIANT AIR TOOL FOR HEAVY-DUTY NUT RUNNING



A pneumatic tool for tightening and removing nuts on bolts from 6" to 12" diameter with power and speed is handled by a hoist or crane. It has been designed for easy positioning with eye-bolt suspension for either vertical or horizontal use.

Impactool 599 is equipped for two-man operation, has a reversible motor and the ball and cam impact mechanism. It runs with a free speed of 330 rpm, and delivers 500 blows per minute when impacting. It weighs 599 pounds, has an overall length of 37½", a side to center dimensions of 7⅞", and a nose diameter of 11¾". It is available with heavy duty impact type sockets and a 3½" square socket driver.

Ingersoll-Rand Co., 11 Broadway, New York 4, N.Y.

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assembly and fastener engineering

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EDITORIAL ITEMS

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WHEATON, ILLINOIS

RESISTANCE SOLDERING TOOL ELIMINATES TIP ARCING

A resistance soldering tool eliminates arcing and provides high-speed, void-free connections.

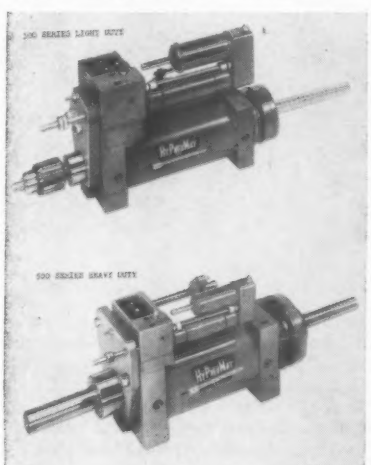
The tool is automatic and particularly adaptable to soldering multiple prong plugs. In a single step operation, the soldering tool provides even heating temperature throughout the work. The new unit eliminates tip arcing or flashing and is hand operated using an internal switch instead of footpedals. The electrode is made of zirconium-tungsten which reportedly does not require frequent redressing, maintenance or replacement due to burn-down.

When soldering multiple prong plugs, the special zirconium-tungsten tip of the soldering tool can be ground to a shape that conforms to the pin shape. This heats the pin so that the solder is completely melted in less than one second, the engineers said.

General Electric Co., Schenectady 5, New York.

Use postpaid card. Circle No. 42

DRILLING, TAPPING UNITS WITH STROKES UP TO 25"



Long stroke automatic drilling and tapping units range in strokes up to 25", supplying the power for varied plant operations.

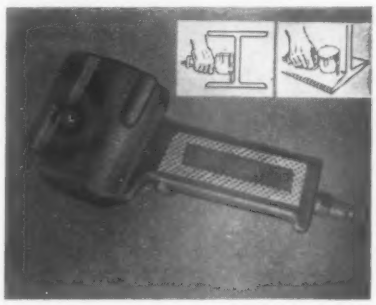
Light duty units are manufactured in stroke lengths to 12", heavy duty to 25", with over 40 standard models available. The units can be interlocked with indexing tables, automatic work feeders and fixtures. A quill extension permits close radial grouping and can be used for multi-spindle drilling and tapping

as well as cavity drilling.

Hypneumat, Inc., 647 W. Virginia St., Milwaukee 4, Wis.

Use postpaid card. Circle No. 43

DRILL MOTOR HANDLES LIMITED ACCESS AREAS



Hand drilling of holes within ¼" of bulkheads and other obstructions and within 9/32" radius in 90° corners is handled with the Spacemite drill motor. The construction permits overload conditions up to ½" reamers or drills.

The drill motor will accommodate standard aircraft threaded shank drills (¼ - 28 thd.), capacity through ¼" diameter. Air consumption is estimated at 18 cu. ft. per minute. Recommended air supply is ¼" air line with 90 psi air pressure. Spindle speed is 3000 rpm (free speed).

Winslow Product Engineering Corp., 47 St. Joseph St., Arcadia, Calif.

Use postpaid card. Circle No. 44

HEADED-PARTS FEEDER, 10-20 STROKES A MINUTE

Automatic and continuous feed, transfer or assembly of headed parts are provided by the model 700 feeder. It has electric control with variable speed from 10 to 20 strokes per minute.

The machine feeds sliding parts ⅛" to 1" in diameter from 1" to 4" long; headed work, same diameters, ½" to 3" long. Hopper capacity is 1½ cu. ft.

The feeder measures 18" x 28" overall and 19" high. Power is entirely self-contained. It uses a ¼ hp 220/440-volt 3-phase motor. Flexible features, including automatic bank control devices, are available without special designs. An over-load safety system is built-in to protect moving parts from damage.

Feedall, Inc., 38399 Pelton Rd., Willoughby, Ohio.

Use postpaid card. Circle No. 45

RESISTANCE WELDING ALLOY HAS HIGH-TEMP DUCTILITY

A new alloy of copper and zirconium for resistance welding reportedly has exceptionally high electrical and thermal conductivity coupled with high strength and hardness.

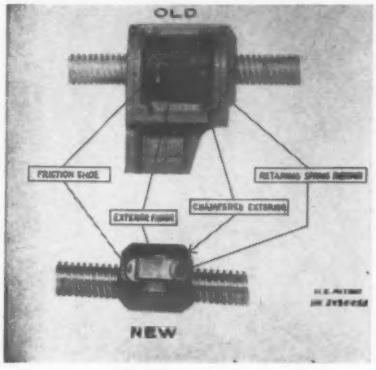
The metal is recommended for applications where improved resistance to annealing or softening is required, and resistance welding applications where other alloys are prone to checking and cracking.

Mallory 28 is also recommended for spot and seam welding of aluminum and magnesium alloys, and steels having low melting point coatings, such as galvanized, aluminized, terne plate, tin plate and cadmium plate.

Metallurgical Division, P. R. Mallory & Co. Inc., Indianapolis 6, Ind.

Use postpaid card. Circle No. 46

REDESIGNED NUT FOR RAPID ACTION CLAMPING TOOLS



A redesigned nut is standard equipment on all Titan rapid action c-clamps, drill press vises, utility vises and woodworkers' vises.

The nut can be tightened a full revolution or more, and has a full threaded steel body. It combines free sliding action with unlimited takeup. To eliminate binding, the nut has a tumbled exterior finish and chamfered corners. The size of the friction shoe has been increased to provide greater contact area with threads.

Wilton Tool Mfg. Co., Inc., Schiller Park, Illinois.

Use postpaid card. Circle No. 47

THERMAL CURING PRESSURE SENSITIVE FIBERGLAS TAPE

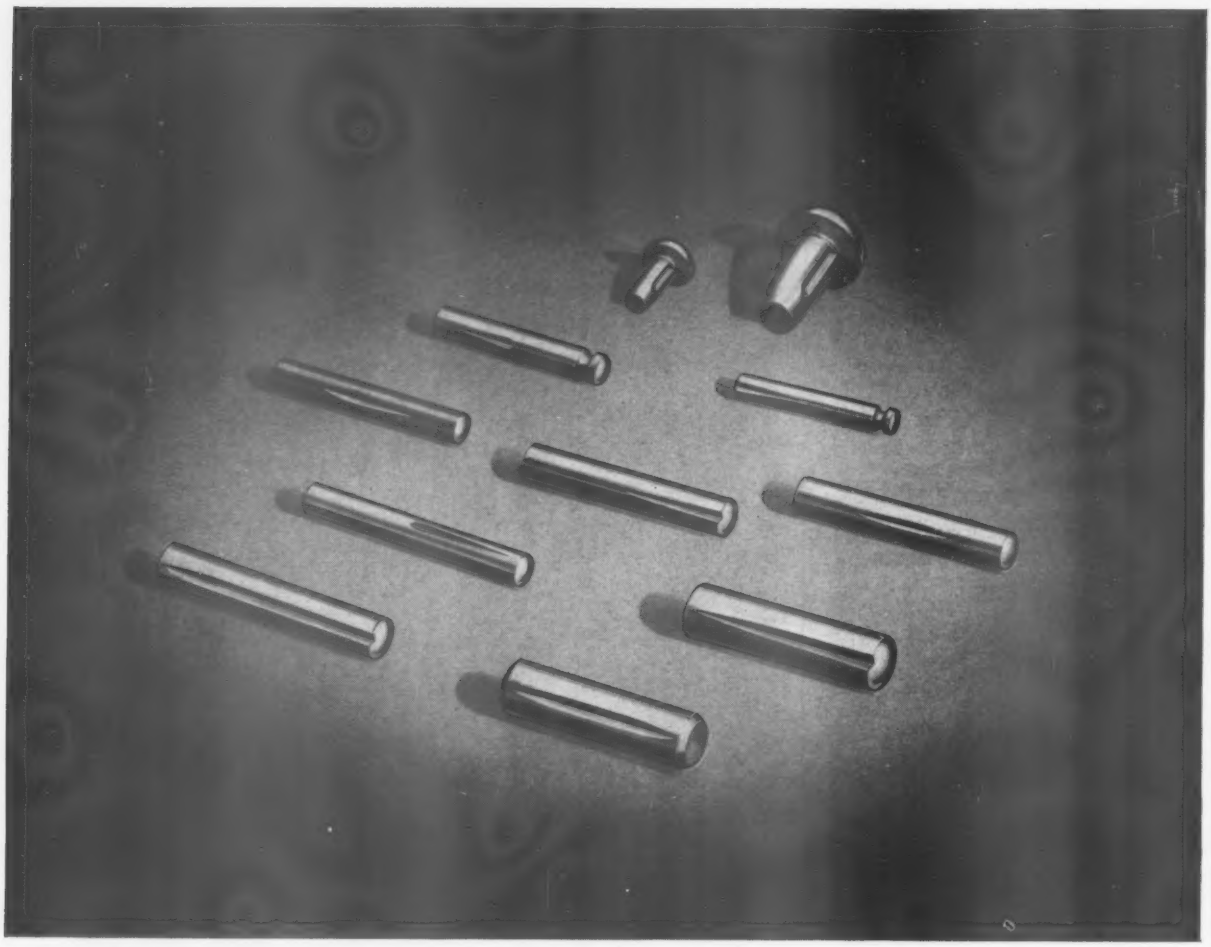
A thermal curing, pressure-sensitive Teflon impregnated fiberglas tape is designed for both mechanical and electrical applications.

Temp-R-Tape TGV is recommended for heat-sealing bars on packaging machinery, or in areas subject to wear or destructive accumulations.

Once the new tape is cured, it will resist the tendency to creep under load. It has a temperature range of —100°F to 500°F, and will adhere to any dry, clean surface.

The Connecticut Hard Rubber Co., 407 East St., New Haven 9, Conn.

Use postpaid card. Circle No. 48

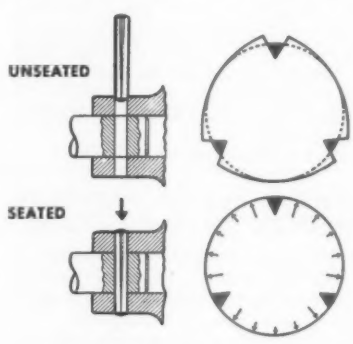


The surest, safest way ever developed to pin two parts together...

THE SOLID GROOV-PIN

Just drill the hole and drive the Groov-Pin home . . . once seated, it stays there, no matter what the conditions of shock and vibration. Yet it can be drifted out and reused with but little loss of its original holding power. No reaming is necessary. Available in nine different types, as well as in drive studs. Diameters from 1/32" to 1/2" and larger for special requirements, in a wide variety of materials. There's a Groov-Pin for every need, including the Type 3H for hopper feeding, and Types 6 and 7 for anchoring tension springs. Standard prices apply to specials in lots of 5000 or more.

Write today for free samples and the new 32-page Groov-Pin catalog... yours for the asking, it belongs in every designer's file of fastener reference literature. Address Groov-Pin Corporation, 1135 Hendricks Causeway, Ridgefield, N. J.



The unique GROOV-PIN locking principle

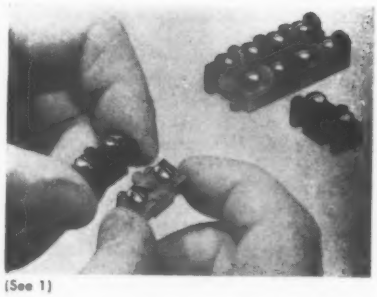
When a Groov-Pin is driven, the material displaced by the grooves is forced to flow back, setting up a powerful locking force. The ability of Groov-Pin to hold under severe shock and vibration . . . and its immunity to vibration fatigue . . . has been thoroughly proved by the billions in use!

GROOV-PIN

Use postpaid card. Circle No. 236

WHAT'S NEW IN FASTENERS

For further information on any of the fasteners listed here, use the handy postpaid card opposite page 56.



(See 1)

(See 4)

(See 2)

(See 5)

TINY TERMINAL BLOCKS SNAP TOGETHER TO STAY

Semi-elastic zytel series G terminal blocks come in ten different colors for simple circuit coding; snap together to form rigid rows which cannot separate after being fastened down. Insulating barriers are integral in each block.

The block measures ⅜" wide, 13/32" high to top of barrier, ¼" high to top of block, ¾" long. Rating is 20A. at 110V.

Full insulation protection is provided between blocks and fastening screws and panel, and between block pairs. Each block has a countersunk mounting screw hole; however, as many as fifteen blocks can be snapped together and mounted with one screw at each end without risk of the blocks coming apart.

Alpha Electric Products Co., 3625 N. Halsted St., Chicago 13, Ill.

Use Postpaid card Circle No. 1

PRE-ASSEMBLED NUTS AND WASHERS ADDED TO LINE

Two new types of "Keps" (pre-assembled nut and washer) have been added to a line of fasteners. The pre-assemblies include plain dished washer Keps and conical washer Keps and are recommended for spanning bolt holes and distributing the fastener load around and away from the hole.

These types are available in sizes from No. 8 to 5/16, with various washer sizes.

Shakeproof Division, Illinois Tool Works, St. Charles Rd., Elgin, Ill.

Use postpaid card. Circle No. 2

CLAIM THREAD STRIP-PROOF JOINTS FOR THERMOPLASTIC

A tough, rigid thermoplastic, Delrin resin, is said to be excellent both as a fastener material and for the strong joints possible with a variety of fastening techniques.

Bonds with a strength approaching parent metal are obtained by welding. It is claimed that it is impossible to strip threads cut into the plastic by self-tapping screws. It has been tested with mechanical fasteners, explosive rivets, and used for some 500 products.

Typical properties are: tensile strength and yield point at 73°F, 10,000 psi, 158°F, 7500 psi. Shear strength is 9510 psi, deformation under load (2000 psi at 122°F.) 0.5 Rockwell hardness is M94, R120.

Polychemicals Dept., E. I. duPont de Nemours & Co., Inc., Wilmington 98, Delaware.

Use postpaid card. Circle No. 3

LIGHTWEIGHT LOCKNUT FOR 800°F APPLICATIONS

A locknut for temperature applications up to 800°F on aircraft and missiles is reportedly as much as 60% lighter than NAS 679 type sheet-metal nuts. It is made of austenitic stainless steel.

The external hexagon drive FN 812 meets the locking torque and vibrational requirements of MIL-N-25027. Wrenching strength with a socket or box wrench exceeds the values of this specification.

A prevailing-torque locknut, that serves as a stop nut as well, a small displacement of the uppermost part of the hexagon wrenching area during manufacture produces spring-tension locking action in the threads.

Standard Pressed Steel Co., Jenkintown, Pennsylvania.

Use postpaid card. Circle No. 4

SAFER HOIST OPERATION PROVIDED BY NEW LATCH

An inexpensive safety latch for hoist hooks which prevents accidental detaching and dropping of loads can be fitted on any hoist hook in a matter of minutes, with simple hand tools, to provide complete safety.

The new safety device has only two major parts—clamp-on collar and a corrosion resistant spring-loaded safety latch which fits into the hook opening.

The collar is made of a manganese-bronze alloy that is sufficiently ductile to conform to the contour of any hook shank, regardless of its shape.

The latch is held firmly in place by a stainless steel spring which provides constant pressure between latch

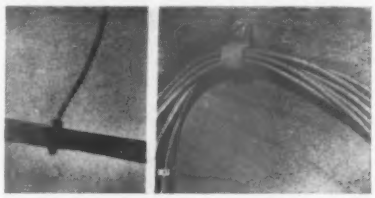
and hook. In addition, the latch is notched on its free end to prevent shifting from the locked position.

The safety latch available in four sizes—for one-quarter to three ton units—will fit any manufacturer's hooks.

The Harrington Company, Gravers Rd., Plymouth Meeting, Pa.

Use postpaid card. Circle No. 5

PLASTIC CLAMPS, WIRING TIES FOR ELECTRONIC USE



Two types of molded plastic wiring accessories have been developed for electronics and electrical use: reusable cabling tie and a cable clamp.

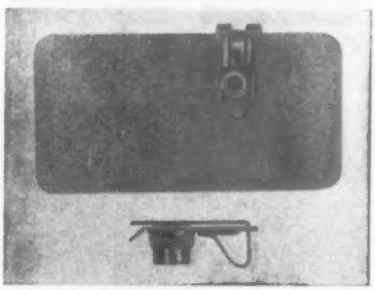
Looking like a bead bracelet, the wire cabling tie is molded of polyethylene to form a single 4½" long piece. To use it, simply bend it around the group of wires to be cabled, insert the free end through an eye molded in the other end, and pull it tight. It is available in three colors and withstands 45 lbs. pull.

Nylon or ethyl cellulose cable clamps are styled after metal cable clamps which have been in use for years. The plastic fasteners are made of insulating material, more flexible than metal and the "give" of the plastic helps the clamp absorb mechanical shocks so that it is difficult to pull the cable loose.

Gries Reproducer Corp., 400 Beechwood Ave., New Rochelle, N.Y.

Use postpaid card. Circle No. 6

CLIP-ON TYPE FASTENER FOR ONE-SIDE-ONLY ACCESS



A snap-on "U" type nut plate fastener is designed for one-side-only access on a range of panel thicknesses. It requires only one hole.

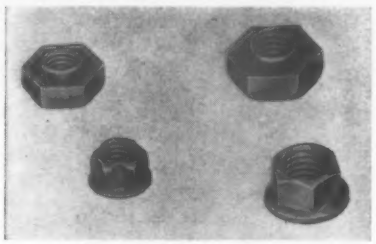
As the Clip Nut is opened, the nut rises vertically and the clip "legs" stay parallel. The fastener is slipped over the panel edges; the extrusion on the clips snaps into the hole and the spring holds the clip in place. The panel is positioned and screw inserted.

Performance conforms to MIL-N-25027, not obtainable with sheet metal or self-tapping screws.

Shur-Lok Corp., 879 S. East St., Anaheim. California.

Use postpaid card. Circle No. 7

LIGHTWEIGHT LOCKNUT WITH "MINIMIZED HEX"



A line of high strength self-locking nuts is claimed to be 40% lighter than current NAS types.

The "minimized hex" body section of the Type LH3324 nut is fortified with a base ring for thread load distribution, and to provide bearing area for use with soft metals. The locknut offers wrenching dimensions two socket sizes smaller than equivalent NAS or AN nuts.

Parts meet all applicable performance requirements of AN-N-10 and MIL-N-25027 (ASG). For temperatures up to 550°F parts are of heat treated carbon steel, cadmium plated with a supplementary molybdenum disulphide dry film lubricant. Type LH3358, is provided for temperatures up to 900°F and is made of A286 corrosion resistant steel.

Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N.J.

Use postpaid card. Circle No. 8

COMPOSITE PLASTIC SCREW WITH METAL CORE

A composite plastic screw with a metal core reportedly has the insulating properties of plastic combined with the strength of metal.

Insul-Screw consists of a serrated metal core with a threaded plastic body. The core carries the torque applied by the driver, eliminating the danger of breaking or distorting the head.

Standard materials for the screw are nylon and steel. Other plastics and metals are available for special applications.

The fastener is self-insulating, said to eliminate vibration and corrosion problems and is self-locking. It can be supplied in a wide range of colors for coding or for decorative purposes.

Austin Screw Products Co., 4873 West Armitage Ave., Chicago 39, Ill.

Use postpaid card. Circle No. 9

TAPPING STUDS FOR FIELD ERECTED SANDWICH WALLS

Tapping studs for constructing field-erected sandwich walls enable one crew to handle the complete erection job on curtain walls as the sheeting progresses.

The two-piece fastener has a hex collar at the base of the stud which

makes for easy and straight driving. It eliminates the wobble caused by gripping the outer end of the stud.

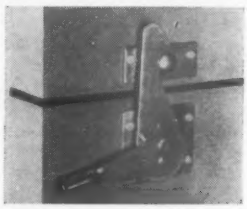
Since the inner sheet is put in place and attached, instead of being impaled over previously installed studs, flat as well as corrugated sections are practical.

The cap locks the outer sheet in place, preventing vibration loosening.

Townsend Co., Box 237-Z, New Brighton, Pennsylvania.

Use postpaid card. Circle No. 10

CONTAINER LATCH WITH 750 LB. LOAD CAPACITY



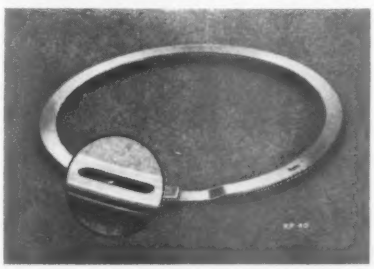
The Hook-Lock, a latching device for use on rigidly specified military cases and commercial containers, is positive-locking without springs, and provides a closing pressure of 200 lbs. with the standard operating lever. Modified levers increase this substantially where applications call for greater pull-down pressure. Load-carrying capacity of the standard fastener is 750 lbs.

Open or closed, the latch lies flat against the container on which it is mounted. At its thickest point, the fastener extends 7/16" from the container surface. Since operation is parallel to mounting surface, no space for operating clearance is required.

Simmons Fastener Corp., North Broadway, Albany 1, N.Y.

Use postpaid card. Circle No. 11

RETAINING RING LOCKS UNDER CENTRIFUGAL FORCE



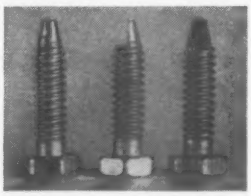
A self-locking retaining ring that automatically locks when centrifugal force is applied is said to be designed for high rotative applications or for applications where dirt or other foreign material tend to force the retaining ring out of its groove.

The basic Spirolox ring is manufactured from flat spring steel, coiled on edge to effect a 360° retaining surface. The self-locking feature consists of two slots and two raised tabs which automatically lock when outward pressure is exerted on the ring. They are installed without counterboring, special machining or turning of shoulders.

Ramsey Corp., 3693 Forest Park Blvd., St. Louis 8, Missouri.

Use postpaid card. Circle No. 12

SHEET METAL SCREW IS SELF-DRILLING, TAPPING



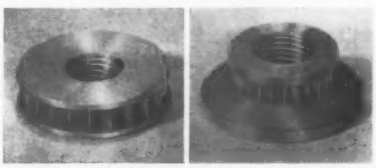
A self-drilling, self-tapping screw is designed to eliminate pre-drilling and alignment problems during product assembly.

Developed primarily for use with power tools and in automated assembly operations, the screw can be hopper fed and oriented for correct driving. It can also be pre-assembled with various types of lock washers or sealing washers for specific applications.

Reliance Div., Eaton Mfg. Co., Massillon, Ohio.

Use postpaid card. Circle No. 13

STAKED FASTENER FOR FREE-FLOWING SHEET



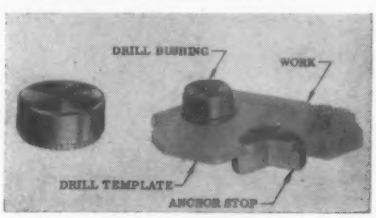
The type M staked fastener provides load bearing threads in thin, free flowing sheet material such as aluminum, brass, panel steels and copper. Shoulder types for maximum strength are available for panels .031" to .250" thick.

Gripping strength is derived from the cold flow of the panel material into the recessed, knurled grooves of the fastener during installation. Installation is by standard presses, adjustable to pressure or stroke. The fasteners, being round, need no indexing.

My-T-Grip Mfg. Co., Inc., 176 Broadway, New York 38, N.Y.

Use postpaid card. Circle No. 14

ANCHOR STOPS FOR DRILL TEMPLATES

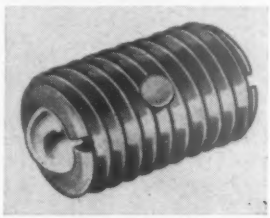


Anchor stops, providing a simple, accurate method of indexing a template over the work prior to drilling are pressed into a drilled or punched ⅜" dia. hole in .060" or thicker aluminum template material.

The double row of serrations at the base of the stop provides a postive lock into the template. The stop has a ½" diameter and can extend beyond the surface at heights from .125" to .375".

Hi-Shear Rivet Tool Co., 2600 W. 247th St., Torrance, Calif.
Use postpaid card. Circle No. 15

SELF-LOCKING BALL PLUNGER IN 12 END PRESSURES

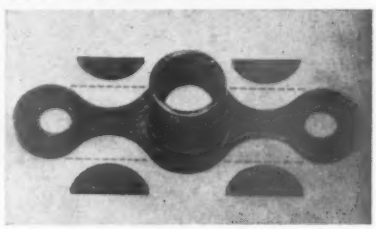


Compact ball plunger units made of type 440 hardened stainless steel are available in 12 end pressures.

The plungers are made in four sizes, with or without a self-locking Nylok insert. Plungers are used in indexing automatic feed devices, locators in progressive dies, in torque-limiting clutches and elsewhere.

Vlier Engineering Corp., 8900 Santa Monica Blvd., Los Angeles 46, Calif.
Use postpaid card. Circle No. 16

LIGHTWEIGHT ANCHOR NUTS CUT WEIGHT 23 PERCENT

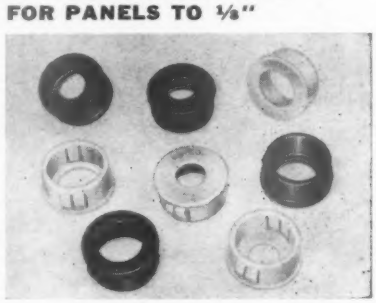


Anchor nuts reportedly average 23% less in weight while more than meeting applicable NAS.

The weight/master nut design is achieved by removal of excess metal without any sacrifice in performance.

Voi-Shan Mfg. Co., 8463 Higuera St., Culver City, Calif.
Use postpaid card. Circle No. 17

NYLON SNAP BUSHING FOR PANELS TO ⅛"



A nylon snap bushing snaps into a ⅞" diameter chassis hole and locks under finger pressure. No threaded holes or nuts are required to hold it in place. It cannot be removed unless the nylon step-clips are compressed.

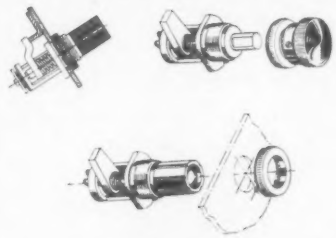
The snap bushing is UL and CSA approved, and may be locked into panels of varying thickness up to ⅛". It is available with various inside diameters,

and requires no tools to install. Samples.

Heyman Mfg. Co., 1200 Michigan Ave., Kenilworth, N. J.

Use postpaid card. Circle No. 18

ADJUSTABLE PAWL FASTENER FOR PANELS, DOORS, FRAMES



An adjustable pawl fastener eliminates the parts usually required to hold the fastener body to door or panel. One 9/16" diameter hole takes the fastener shaft, another .082" diameter hole receives a stop pin on the fastener to prevent it from rotating.

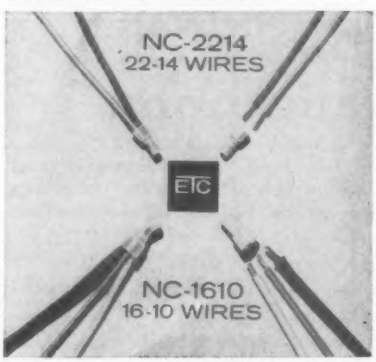
No. 48 fastener automatically adjusts its pawl position to accommodate variations in frame thickness up to ¼". Continued rotation of the plastic and steel knob increases applied pressure.

The fastener is supplied in three types for frame thickness up to ¼", ¼" to ½", and ½" to ¾". Two knob styles are available or the fastener is supplied with flatted shaft, so that any knob having a ¼" hole can be used.

Southco Division, South Chester Corp., Lester, Pa.

Use postpaid card. Circle No. 19

NYLON-INSULATED PIGTAIL CONNECTORS



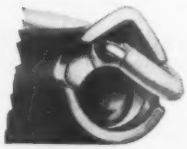
Nylon-insulated solderless connectors for pigtail splicing of two or more wires are formed of translucent nylon in a closed-end design. The new units replace methods of individually splicing and then insulating with tape or tubing.

Wires are inserted, then crimped in a single operation. The splice is permanently anchored and insulated, cannot be loosened by vibration. Part No. NC-1610 takes any number and combination of wires totaling in gage from No. 16 through No. 10 AWG. Part No. NC-2214 accepts wires totaling No. 22 through No. 14 AWG.

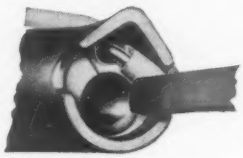
Electrix Terminals & Connectors, Inc., 990 East 67th St., Cleveland 3, Ohio.

Use postpaid card. Circle No. 20

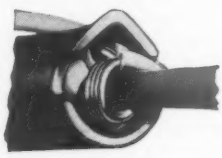
CONNECTIONS IN ONLY THREE SECONDS



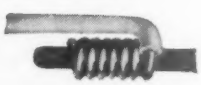
Wire insertion and anchoring



Terminal insertion

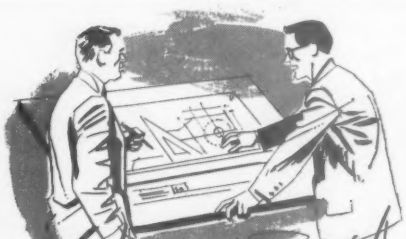


Wrapping



Finished connection

Wrap up wiring jobs fast with solderless wrapped connections



Research takes the long view as Gardner-Denver engineers strive to improve existing products . . . to develop new ones to keep ahead of a fast-paced, rapidly growing industrial world.

Fast, economical, solderless, metal-to-metal electrical connections which resist vibration failure and corrosion. That's the solderless wrapping method—proved superior by billions of connections without a reject.

With a lightweight, fast-acting Gardner-Denver "Wire-Wrap"® tool, you wrap up wiring jobs fast . . . and you get these profit-building benefits:

Greater production. Only three seconds total time per solderless connection. Actual connecting time, 1/10 second.

Lower production costs. You eliminate the expense of precise process control required by other methods.

Reduced labor costs. More connections per operator, with less fatigue. No faulty connections that require expensive hand repair work.

Higher quality. Mechanically strong connections electrically stable—proved most reliable in the industry.

Write for Bulletin 14-1

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ont.

Use postpaid card. Circle No. 243

USEFUL LITERATURE

To receive your copy of any literature reviewed here, use the postpaid card opposite page 56.

NUT SETTING GUIDE

"Automation in Assembly" is the title of a profusely illustrated, 24-page manual detailing multiple nut setting. The background of clutch control, capacities of multiple units, bolt spacing, regulation, air supply, the master valve, quality controls are subjects clearly explained. Thor Power Tool Co., 181 N. State St., Aurora, Ill.

Use postpaid card. Circle No. 51

FASTENING SOFT METALS

How a self-tapping, self-locking insert acts as a permanent fastener in machinable materials is discussed in a 12-page bulletin. Tap-Lok threaded bushings are used with soft metals, plastic and wood. Types, applications, specifications, installation tools are pictured and described. Groov-Pin Corp., 1125 Hendricks Causeway, Ridgefield, N.J.

Use postpaid card. Circle No. 52

STAINLESS STEEL GUIDE

Buyers of stainless steel will find a 190-page guide to products and services most valuable. Names and addresses of suppliers are given under alphabetically-categorized product listings. Services (i.e. fabricators, stamping) are similarly treated. Producers of stainless steel are listed with their various products. American Iron and Steel Institute, 150 E. 42nd St., New York 17, N.Y.

Use postpaid card. Circle No. 53

TERMINALS, CONNECTORS

Mass producers of electrically-wired products will be interested in a 112-page manual designed to aid in the selection of terminals and connectors and automatic wire terminators. The handsome catalog contains "user" information—case histories, features, application techniques, tables—and specifications of open and closed barrel terminals, receptacles, tabs, connectors, pins and plugs, contacts, patchcord programming systems. Automatic machines are also specified. Illustrated. AMP Inc., Eisenhower Blvd., Harrisburg, Pennsylvania.

Use postpaid card. Circle No. 54

ADHESIVES APPLIED

Plastic-type adhesives for bonding metals, plastic, wood, glass, paper, cloth, and leather are outlined in 12-page catalog No. 1. In large, easy-to-read type the complete line is discussed, and then each type is specified with regard to uses, characteristics, process and limitations. Cordo Chemical Corp., 34 Smith St., Norwalk, Conn.

Use postpaid card. Circle No. 55

CONVEYOR SYSTEMS

From "start to finish" conveyor service is offered in an eight-page brochure, which prominently features names of users. Facilities for engineering, fabricating, installing and testing the materials handling system are pictured and typical applications given. J. C. Corrigan Co., 41 Norwood St., Boston 22, Massachusetts.

Use postpaid card. Circle No. 56

NEED LEAKPROOF JOINTS?

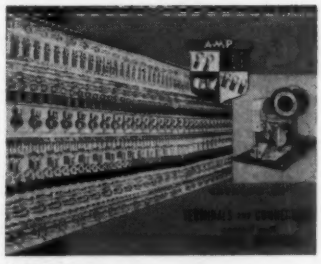
Fluid coupling nuts designed to maintain tight joints on fluid lines are described in four-page Form 2488. Design and performance features of two series of one-piece, self-locking nuts are shown.. Test results on locking properties are charted. Standard Pressed Steel Co., Box 1121, Jenkintown, Pa.

Use postpaid card. Circle No. 57

"BUILDING BLOCK" UNITS

An indexed 96-page handbook deals with standard unit components, describing the Work Center System and cataloging all the off-the-shelf "building blocks" available. Automating production, setting up plant power, lighting, stockrooms, supplying special and

(See 51)



(See 54)

(See 52)

small space machines are some of the services offered, standardized for speed. Alden Systems Co., Alden Research Center, Westboro, Mass.

Use postpaid card. Circle No. 58

LOCKING INSERT

Six-thread anchoring in bolting metal to metal, wood and plastic is provided by the Weg locking insert. Bulletin AR-080 illustrates installation steps, gives dimensions and a table showing tensile strength at various loads and installation tools. Airaterra, 620 Paula Ave., Glendale 1, Calif.

Use postpaid card. Circle No. 59

PELLET-LOCKING FASTENER

Self-locking, sealing, adjusting are the features emphasized for threaded bolts and screws in a two-color, four-page engineering sheet. A nylon pellet inserted in the threads provides the extra duty. Photographs, application drawings and a seven-point list of engineering recommendations are included. Nylok-Detroit Corp., 1100 N. Woodward Ave., Birmingham, Mich.

Use postpaid card. Circle No. 60

USING LOCK NUTS?

Lock nut buyers will be interested in an up-to-date 48-page price and data list (bulk). Five nut models feature an anchoring nylon collar which locks nut to mating part. Complete specifications. Greer Stop Nut Co., 2618 W. Flournoy St., Chicago 12, Ill.

Use postpaid card. Circle No. 61

RESISTANCE WELDERS

Resistance welders designed specifically for the sheet metal, wrought iron, wire fabricating and tubing industries are outlined in a six-page brochure. Flash, projection, butt, spot and gun welding machines are pictured and described. Alphil Spot Welder Mfg. Corp., 1058 Pacific St., Brooklyn 38, N.Y.

Use postpaid card. Circle No. 62

USES FOR BLIND RIVETS

Applications of one-piece blind rivet with internal threads are pictured and outlined in an interesting 14-page data bulletin. Rivnut types, work preparation procedure, tool adjustment and specifications are dealt with through art and text. B. F. Goodrich Aviation Products, 448 S. Main St., Akron, Ohio.

Use postpaid card. Circle No. 63

PRODUCTION NUT SETTING

A pair of redesigned portable pneumatic nutsetters are featured in a two-color, four-page bulletin. The Keller 16A-2 horizontal and vertical models are said to have wider torque range, increased power, among other features told. Specifications listed. Gardner-Denver Co., Quincy, Ill.

Use postpaid card. Circle No. 64

AIR POWERED RIVETING

A pneumatic riveter which automatically feeds and sets steel or aluminum alloy rivets is described in a four-page brochure. Features of the foot-pedal operated machine are explained and illustrated. Specifications. The Tomkins-Johnson Co., Jackson, Mich.

Use postpaid card. Circle No. 65

STAKED FASTENER

Shoulder or flush type fasteners which provide load bearing threads in thin, free-flowing sheet metal are described in four-page Catalog M200. Step-by-step installation drawings and text accompany specification tables and a chart indicating the turning forces necessary to dislodge a mounted component. My-T-Grip Mfg. Co., Inc., 176 Broadway, New York 38, N.Y.

Use postpaid card. Circle No. 66

PLASTIC FASTENERS

Polyvinyl chloride bolts and nuts are introduced in a four-page folder. Non-corrosive, non-toxic, non-conductive, the fasteners are light and machinable. Available in sizes ¼" through ¾" diameter, ½" through 6" long. Applications suggested. Samples. Industrial Plastic Fabricators, Inc., Norwood, Mass.

Use postpaid card. Circle No. 67

WELD AND CAGE NUTS

Blueprint-type drawings of weld nuts (regular, pilot, floating cage) and cage nuts (regular and floating clinch) comprise a 30-page catalog. Materials, dimensions, sizes, ordering information presented. The McLaughlin Co., 212 Jaikins Bldg., Birmingham, Mich.

Use postpaid card. Circle No. 68

LATCHES, LOCKS

Draw and snap bolts are pictured and specified in 10-page Catalog 66. Types and uses of hardware for luggage and portable cases emphasized. Eagle Lock & Screw Co., Terryville, Conn.

Use postpaid card. Circle No. 69

ELECTRIC ASSEMBLY TOOLS

A complete line of solenoid-operated impact hammers, punches, stakers and Geneva action indexing tables for the electrical and electronic fields are presented in 12-page Catalog 75. Included is a section on automatic production machinery for special assembly problems. Cutaway photographs of the tools, application suggestions and model specifications are given. Black & Webster, Inc., 445 Watertown St., Newton 58, Massachusetts.

Use postpaid card. Circle No. 70

AIRCRAFT-QUALITY BOLTS

Facilities for producing both standard alloy and special fasteners are described in a four-page folder. Samples of aircraft bolts fabricated are pictured: heads hot forged, threads rolled. Aircraft Bolt Corp., 701 W. Garvey Blvd., El Monte, Calif.

Use postpaid card. Circle No. 71

WELDING MANUAL

A catalog of welding products has been combined with a pocket-sized guide to welding practice in a 32-page brochure. It describes the firm's full line of stainless, low-alloy, non-ferrous rods and electrodes for manual, automatic and semi-automatic welding.

applications, AWS-ASTM designations, popular name type, heat treatment data for maximum properties pre-heating data, and tensile properties. Arcos Corp., 1500 S. 50th St., Philadelphia, Pennsylvania.

Use postpaid card. Circle No. 72

AIDING SET SCREW USERS

Expanded laboratory services for re-analyzing user set screw requirements are introduced in a single-sheet flyer. Answers are invited to 10 questions encouraging inquiry about cost-cutting recommendations. Set Screw & Mfg. Co., 26 Main St., Bartlett, Ill.

Use postpaid card. Circle No. 73

DOUBLE STROKE HEADER

Two-color Bulletin 10 introduces the Omega "O" solid die double stroke precision cold header, built for miniature parts. Photograph, machine features and general specifications included. Designed for high precision work. The Robert E. Morris Co., West Hartford 7, Connecticut.

Use postpaid card. Circle No. 74

MACHINE SCREW NUTS

Prices for machine screw nuts in steel, brass and aluminum are quoted in a four-page brochure. Equipment for producing single and double chamfered standard nuts and large and small pattern nuts is pictured. T.N.F. Corp., 1052 E. Elizabeth Ave., Linden, N.J.

Use postpaid card. Circle No. 75

DRILLING & TAPPING

Guaranteed production rates are listed in a four-page brochure which describes the performance of a drilling and tapping machine. Type of work, machine operation, set-ups, specifications, accompany illustrations. Batchelder Engineering Co., Springfield, Vt.

Use postpaid card. Circle No. 76

ELECTRODES, DIE ADAPTORS

Resistance welding die adaptor assemblies and electrode inserts are designed to cut downtime to a minimum. A four-page bulletin outlines the advantages of the assemblies, shows nomenclature and dimensions of each part. Both flat faced standard and special inserts are available. P. R. Mallory & Co., Inc., Box 796, Indianapolis, Indiana.

Use postpaid card. Circle No. 77

MACHINE SCREWS, NUTS

Machine screws and machine nuts, rivets and bolts are catalogued in an illustrated 50-page booklet. Specifications and ordering data for both packaged and bulk quantities. Included is section on special finishes, standard gages, chain discounts. Pawtucket Screw Co., 143 Hughes Ave., Pawtucket, R.I.

Use postpaid card. Circle No. 78

CUT STUD SETTING COSTS

Nine ways to save time, money, materials in stud setting are pointed out in a pocket-sized flyer. Features of the self-locking, self-tapping Schweppe stud are given and a form invites figures for cost comparisons. Pheoll Mfg. Co., 5700 W. Roosevelt Rd., Chicago 50, Ill.

Use postpaid card. Circle No. 79

WELDING EQUIPMENT

Helpful reference material on resistance welding and electrode selection and application supplement catalog data on equipment. A 16-page Bulletin 2-100 specifies welding heads, machines, AC and DC controls with text, tables and specifications. Raytheon Mfg. Co., 100 River St., Waltham 54, Mass.

Use postpaid card. Circle No. 80

O-RING SEALING

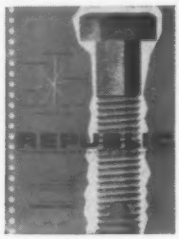
Bulletin AD-148 deals with the design and application of O-rings: materials, dynamic and static applications, use of back-up or non-extrusion rings and groove design for this style of packing. The 20-page booklet will interest both designers and users. The Garlock Packing Co., 432 Main St., Palmyra, N.Y.

Use postpaid card. Circle No. 81

DIAL FEED PRESSES

Dial feed presses which perform staking, crimping, riveting and assembly operations are described in a 20-page catalog on open back inclinable presses. Fifteen 10 and 12 station presses are specified with dimensional drawings and features given. Federal Press Co., Elkhart, Indiana.

Use postpaid card. Circle No. 82



SELF-LOCKING BOLTS

The locking action of Nylok bolts, accomplished with nylon inserts in the body of the fastener, is explained in four-page Form 792. Features of the vibration-proof, adjustable bolt are illustrated. Materials, threads, finishes are given. A table shows the maximum installation torque and minimum static torque at first and fifth removals. Bolt and Chain Div., Republic Steel, 1970 Carter Rd., Cleveland 13, Ohio.

Use postpaid card. Circle No. 83

IMPORTED SCREWDRIVER

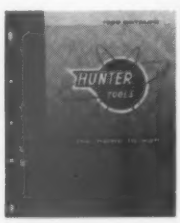
English-made Russell screw or pin driving machines are described in six-page Bulletin-SD. The automatic, magazine-fed heads are also adaptable to vertical-spindle drill presses. Models are pictured and specified with fastener capacities and applications given. H&G Sales Corp., 150 Truman St., New Haven 6, Connecticut.

Use postpaid card. Circle No. 84

RIVETS—TUBULAR, SPLIT

Current prices for tubular and split rivets per 1000 are listed in a 10-page catalog. Each rivet type is illustrated in actual size and priced by length, diameter, material and finish. Standards and specials available. American Rivet Co., Inc., 849 N. Kedzie Ave., Chicago 51, Illinois.

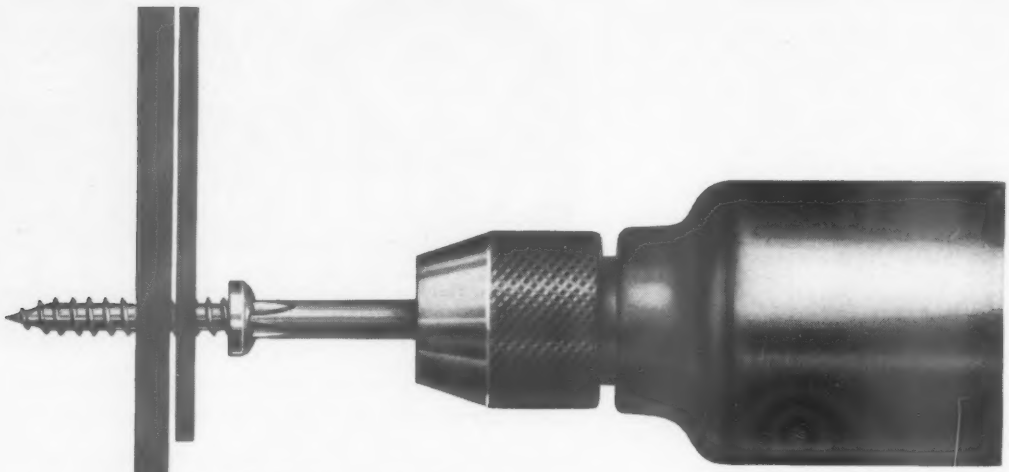
Use postpaid card. Circle No. 85



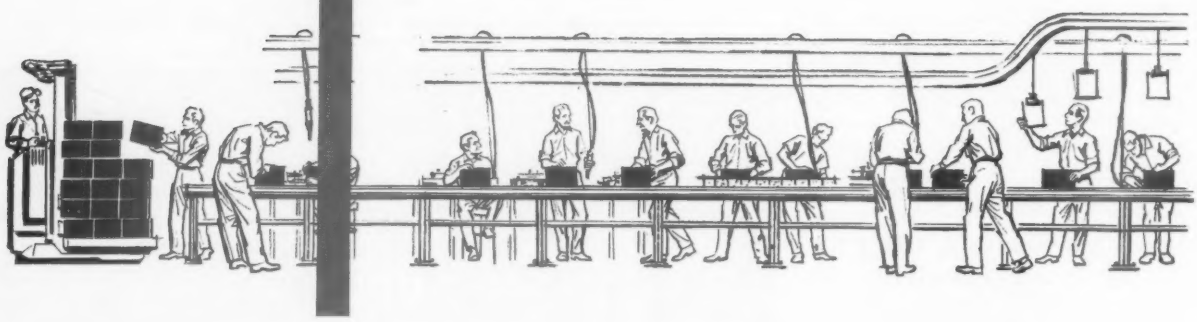
ASSEMBLY TOOLS

A complete line of manual assembly tools, including nut, screw and hex drivers of all types, are illustrated and specified in a 32-page catalog. New design features are pointed out. Prices given. Hunter Tools, 9851 Alburtis Ave., Santa Fe Springs, Calif.

Use postpaid card. Circle No. 86



Why pay $78,000 for $3,500 worth of Fasteners?



When you make a value analysis of assembly costs, be sure you include *all* the factors involved.

The key lies in the fact that 81% of your assembly cost is labor and only 19% is the cost of the fastener.

So the true way to improve your profit is by cutting the labor costs that come out of profits — not by using fasteners just because they cost a few pennies less per thousand.

For example: Why pay $78,000 for $3,500 worth of fasteners? A case in point would be a manufacturer who bought fasteners at a low price per thousand only to find it took money out of profit to replace the low-price, sub-standard fasteners that failed in application resulting in $78,000 of *their* product being rejected by their customer.

Prove it for yourself. Your American Screw Company representative and your industrial distributor can start you on your own Profit Improvement Program by showing you how you can *know* you're buying quality fasteners that improve your profits. Call today. Or write directly to us.

Profit Improvement Program

In every phase of modern fastening and assembling . . . new products, new applications, new packaging, quality control . . . American's Profit Improvement Program spells more profit for you. Ask your American Screw Company salesman about these ideas you will find profitable.

Quality fasteners cost more to produce . . . improve your profits when used.

The Biggest News in Fasteners comes from

American SCREW COMPANY

Willimantic, Conn. • Detroit, Mich. • Chicago, Ill.

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INDUSTRY MAKES NEWS

American Welding Society president-elect C. I. MacGuffie of Air Reduction Sales Co. receives gavel from retiring president G. O. Hoglund of Aluminum Company of America. The elections were held in Chicago.

Detroit Tech engineering students study the assembly of a 1958 Mercury. This 3/8ths scale model contains 400 separate parts, with blueprints to match.

A.W.S. ELECTS MacGUFFIE PRESIDENT

Charles I. MacGuffie, manager special products department, Air Reduction Sales Co., New York, has been elected president of the American Welding Society. He will take office June 1 and during the 1959-60 fiscal year will direct the Society's activities.

MacGuffie has been active in the welding industry for 35 years. From graduation in 1925 from Pennsylvania State University until Nov. 1958 he was employed by General Electric.

At its annual meeting in Chicago, the AWS also elected R. D. Thomas, Jr., president of the Arcos Corp., Philadelphia, as first vice-president and A. F. Chouinard, director of research and development at National Cylinder Gas Co., Chicago, vice-president.

Ten other outstanding leaders in welding were awarded District Meritorious Certificates.

FUTURE ENGINEERS STUDY AUTO ASSEMBLY

Engineering students at Detroit Institute of Technology are opening new horizons in their study of assembly methods, drafting and tool and die design through the use of a 3/8" scale model car and full blueprints.

DIT's College of Engineering was given a plastic scale model of the body of the 1958 Mercury containing 400 separate parts.

Dean L. L. Henry points out that the car and prints will acquaint students with actual conditions encountered in industry. "We can disassemble the body and build it up again piece by piece, checking on all these points just as it is done in industry," he said.

ILLINOIS TOOL WORKS' INVENTOR HONORED

O. Jules Poupitch, inventor and chief research consultant for the Illinois Tool Works, Chicago, has received the 1959 alumni distinguished service award of Illinois Institute of Technology.

Poupitch was cited for his contributions to industry. He holds nearly 150 patents, many for fastening devices used in the automotive, household appliance, radio and television fields.

About 750 Illinois Tech alumni and friends at-

continued

tended the dinner held May 15 in Chicago.

Poupitch marked 25 years of service with Illinois Tool Works in 1958. His affiliations include the Institute of Aeronautical Sciences, Engineering Society of Detroit and American Men of Science. He resides with his wife and three children in Itasca, Ill.

J. F. LINCOLN HONORED BY WELDING SOCIETY

James F. Lincoln, chairman of the board of Lincoln Electric Company, was made an honorary member of the American Welding Society at the opening ceremony of the 40th annual meeting of the Society in Chicago. The award was made in recognition of his exceptional accomplishments in the development of the welding art.

Mr. Lincoln is a pioneer in the manufacture of arc welding equipment. He has been vice president, general manager and President of the Lincoln Electric Company.

PARKER-KALON APPOINTS FOUR EXECUTIVES

General American Transportation Corp., Chicago, has announced four new executive appointments at Parker-Kalon fastener manufacturing division.

Louis Lovisek, chief engineer, has been named manufacturing manager, in charge of manufacturing, planning and engineering. Harold Rosenberg, was named plant manager, and Ed Holmes promoted to planning manager. Herb Rodaman was named assistant general manager, responsible for purchasing, accounting and industrial relations.

All four men have been with Parker-Kalon for over 20 years.

AIRTEK DYNAMICS ACQUIRES RESEARCH FIRM

Airtek Dynamics, Inc., Los Angeles, has acquired Research Welding & Engineering Co., Inc., of Compton, Calif. Merger of the firms creates a one-source subcontractor for engineering, forming, welding and machining components and assemblies of high-temperature-resistant exotic alloys.

John A. Toland, founder of RW&E, will serve as vice-president and director of Airtek.

NARMCO ADDS OVERSEAS SALES OFFICES

Narmco Resins & Coatings Co. has opened technical sales offices in Japan and Australia, announced Clifford W. Brown, president. The firm also has representatives in seven European cities.

Narmco's technical representative in Tokyo is Tokyo Sales, Inc., and in Australia, J. A. Latham Pty., Ltd.

PHEOLL APPOINTS ADAMEK GENERAL MGR.

Stanley C. Adamek has been appointed general manager of Pheoll Mfg. Co. Inc., Chicago, according to an announcement by Robert P. Lord, president.

Adamek carries to his new position 18 years of experience in the fastener field. Since joining Pheoll in 1953, he has served as plant manager, manufacturing manager, and was appointed assistant general manager in June 1958.

He attended the Illinois Institute of Technology, receiving a B.S. degree in Mechanical Engineering, and served as an engineering officer in the Navy during World War II.

HITCHCOCK'S VAN KAMPEN ON BDSA RESERVE

Robert C. Van Kampen, president of Hitchcock Publishing Co., Wheaton, Ill. has been appointed to the National Defense Executive Reserve, Business and Defense Services Administration.

The announcement was made by Lewis L. Strauss, secretary, U.S. Dept. of Commerce.

The Reserve is being recruited to staff the operation of a production agency in event of national emergency. Van Kampen attended a conference in Washington on May 12-13 when BDSA Reservists were briefed on current mobilization plans.

SCULLY-JONES BUYS JONES & LAMSON LINE

Scully-Jones and Co., Chicago, announced the purchase of all tooling, drawing and existing inventories for the self-opening stud setters formerly made by Jones & Lamson Machine Co. Scully-Jones will manufacture the entire standard line.

BLACK & DECKER ENTERS PNEUMATIC FIELD

The Black & Decker Mfg. Co., Towson, Md., announced the formation of a subsidiary, Master Power Corporation, that has acquired the operations of the Master Pneumatic Tool Comany, Inc., of Bedford, Ohio, and Master Pneumatic Tools (Canada), Ltd., of Toronto, Ont., Canada. The acquisition has been financed by the issuance of 37,004 shares of the capital stock of Black & Decker.

Operations of the subsidiary will be under the direction of Mr. Leonard J. Roll, vice president and general manager.

continued

Roll was formerly secretary-treasurer of the Master Pneumatic Tool Co., Inc. Harry L. Williamson, Jr., former manager—special products division of Black & Decker, will become general sales manager of the new Master organization.

TOP ROCKET ENGINEER JOINS LOCKHEED

Carl E. Johnson, a top rocket engineer, has joined Lockheed Missiles and Space division as executive assistant to Willis M. Hawkins, assistant general manager.

He is president of the Pittsburgh section of the American Rocket Society and is a member of the American Ordnance Association, serving as deputy chairman of the propulsion and rocket sections of the guided missiles division.

CLECO NAMES MAUS WESTERN SALES MGR.

MAUS

CULBERT

R. G. (Dick) Maus was named western division sales manager for Cleco Air Tools, a division of Reed Roller Bit Co., Houston, Tex., announced Ed Slayton, sales manager, who also appointed Robert H. Culbert as sales representative.

Maus has been with Cleco two years as a field engineer in New Orleans. He previously was New Orleans division manager with the G. H. Packwood Mfg. Co. for five years.

Culbert will make his headquarters in Tulsa, Okla., and will cover Arkansas, Oklahoma and the Texas Panhandle. He was most recently with the Hart Industrial Supply Co.

SCREW MACHINE ASSOC. ELECTS PRESIDENT

Recently elected president of the National Screw Machine Products Association is Leonard R. Schaffer, president, Mechanical Art Works, Inc., Newark, N.J.

NSMPA, with headquarters in Cleveland, is the trade association for more than 260 producers of screw machine parts whose output constitutes more than 70% of total national production.

Elected vice president was Charles L. Kerr, president and treasurer of Kerr-Lakeside Industries, Cleveland. Roland G. Herker, vice president and treasurer of Herker Screw Products, Inc., Milwaukee, was re-elected treasurer.

Newly elected trustees include George S. Rosborough Jr., The Measuregraph Co., St. Louis; Ashley F. Ward, Jr., Ashley F. Ward, Inc., Cincinnati; John A. Frey, Hershey Metal Products, Inc., Derby, Conn.; Otto P. Held, O. P. Held, Inc., Yonkers, N.Y.

J. S. Stevens, Forging and Screw Machine Division, Scovill Mfg. Co., Waterbury, Conn.; M. D. Sayre, M. & S. Mfg. Co. Hudson, Mich.; Martin R. Sorensen, Western Automatic Machine Screw Co., Elyria, Ohio; and Wilson B. Creveling, Midwest Screw Products, Inc.

A.S.A. SENDS SHAKEPROOF ENGR. TO PARIS

Walter M. Hanneman, executive engineer of the Shakeproof Division of Illinois Tool Works, Elgin, Ill., has been appointed by the American Standards Association to represent the Association and United States industry at the conference of the International Standards Organization in Paris, France, June 9-11. The conference will consist of meetings of technical committees to further the development of international standards for screw threads applied to screws, nuts, bolts and other threaded items including interchangeable parts of guns and various other mechanisms in both defense and civilian production. Representatives from England, France, Germany, Italy, Russia, and Sweden will be in attendance.

BOWMAN TO DISTRIBUTE duPONT RIVETS

E. I. duPont de Nemours & Company Inc. has appointed The Bowman Products Co., Cleveland, as exclusive world-wide distributor of the new duPont industrial blind expansion rivets.

NEW FASTENER FIRM FORMED IN MICHIGAN

The Wayne Bolt & Nut Co., Dearborn, Mich., was recently formed by principals Henry Wojcik and Raymond C. Claeys.

Offices and manufacturing facilities are located on Haggerty Road in Dearborn. Standard bolts, nuts and screws will be manufactured, as well as specials to customer specifications.

Wojcik resigned in Feb. 1959 as vice-president and sales

continued

manager of Tri-West Products, Inc., Detroit, and Claeys was purchasing agent and treasurer of the same firm.

STANSCREW PROMOTES OLSEN TOP ENGINEER

Standard Screw Co. promoted Bruce E. Olsen to chief engineer for its Stanscrew line.

Under the company's new Stanscrew program, Olsen will be responsible for coordinating production with sales activities, investigation of new fastener products, development of improved engineering data, and assistance in technical sales problems.

Olsen's experience in the fastener field dates to 1946 when he accepted a position in the engineering department of the Chicago Screw Division. Most recently, he served this division as assistant chief engineer in charge of fastener products.

HUBBELL ADDS MIDWEST REPRESENTATIVE

The James F. Roberts Company, Indianapolis, Ind., has been appointed sales representative for the Machine Screw Department of Harvey Hubbell, Inc., Bridgeport, Conn. The Roberts organization will represent Hubbell throughout the State of Indiana and in Western Kentucky.

AS & W MAKES STAFF PROMOTIONS

Simultaneous appointments in U. S. Steel's American Steel & Wire Division announced. Gordon S. Rogers has been advanced to assistant director, production planning, in charge of methods and procedures for the Division. Succeeding Rogers as administrative assistant in the Vice President's office is David J. George.

SPS NAMES WEST COAST SALES MANAGER

JOHNSTON

HUMPHRIES

James C. Humphries has been named to the new post of West Coast district manager in charge of aircraft-missile fastener sales for Standard Pressed Steel Co., Jenkintown, Pa.

Humphries, whose offices are in the SPS Western plant of the company in Santa Ana, Calif., was district manager on the West Coast for the company's industrial fastener sales. He is succeeded in that post by Lewis W. Johnston, whose offices are at the company's El Segundo warehouse.

EXECUTIVE CHANGES AT BUFFALO BOLT

Eric G. Boehn has been named general manager of the Buffalo Bolt Division of the Buffalo-Eclipse Corp., after holding the position of assistant general manager since January, 1959. Boehn has been associated with Houdaille Industries, Inc., for 20 years.

Other executive changes saw Karl L. Miller, affiliated with Buffalo Bolt since 1940, named manager of the com-

continued

pany's Princeton, Ill. plant, Thomas A. Norton appointed factory manager and Walter W. Gohn, comptroller.

I.A.A. ELECTS SMITH WELDING MAN PRES.

L. L. McBurney, president of Smith Welding Equipment Corp., Minneapolis, was elected president of the International Acetylene Association at the 61st annual convention in New Orleans recently.

ALMAY RESEARCH EMPLOYS ALLOY EXPERT

Appointment of Peter Tauber as a staff engineer of Almay Research and Testing Corp., Los Angeles, has been announced by Harry S. Brenner, president.

Tauber, a specialist in the field of light alloys, will undertake research and testing projects in fasteners and allied metal products. Most recently with the consulting engineering firm of Coverdale and Colpitts, Tauber has also been associated with California Institute of Technology.

McNEIL NAMED REGIONAL MANAGER BY HUCK

Appointment of Richard C. McNeil as regional manager has been announced for Huck Mfg. Co., Detroit. McNeil will serve Huck customers in eastern Ohio (including Cleveland), western Pennsylvania (including Pittsburgh) and northern West Virginia.

McNeil is a mechanical engineering graduate of Purdue University. Prior to joining Huck, he had been a sales engineer with Ingersoll-Rand Co. for the past 19 years.

CARPENTER OPENS METALLURGICAL LAB.

The Carpenter Steel Co., Reading, Pa., has put into operation a new metallurgical control laboratory to provide faster service in the production testing of steels to customer specifications.

The new facility enables Carpenter to examine and evaluate steel in manufacture up to five times as fast as was formerly possible, estimates Dr. Carl B. Post, vice president and technical director.

The new lab occupies an area of nearly 10,000 sq. ft., under the supervision of Harry F. Ammarell, plant metallurgist, cold drawing, and staffed by 18 specialists.

EATON MAKES PURCHASING PROMOTIONS

FITZGERALD

Three members of the purchasing staff of Eaton Mfg. Co., Cleveland have been given increased responsibilities under the company's program to expand this phase of its activities, H. A. Williams, director of purchases, announced today.

W. H. Williams, purchasing agent for Eaton's Axle Division here, has been promoted to the central purchasing staff as supervisor of production parts and mill supply buying; Richard F. Fitzgerald was made manager of the purchase research and analysis section of the central purchasing staff; and William E. Davis, previously assistant purchasing agent for Axle, was promoted to purchasing agent of this Division.

continued

KLEIN JOINS McLAUGHLIN AS SALES MGR.

Donald H. Klein has joined The McLaughlin Company, Detroit, as sales manager. Klein will head the local sales effort directed primarily to the automotive field and assist in the supervision of the national sales representative organization.

Klein comes to McLaughlin from Mt. Clemens Metal Products Co. where for 12 years he had been engaged in various sales positions and application-engineering work.

CLEARING APPOINTS NEW PRESS DEALERS

Clearing division of U.S. Industries, Inc., announced two new local dealers for its small assembly press line: R. H. Britton Machinery Sales, Inc., East Syracuse, N.Y., and L. L. Richards & Co., Milwaukee, Wis.

EXECUTIVE ADVANCES AT CHICAGO SCREW

MONGERSON

GWIN

Simultaneous promotions of Paul A. Mongerson to vice-president and W. Dean Gwin to factory manager have been announced by the Chicago Screw Co., division of Standard Screw Co.

Henry C. Langille has been promoted to assistant chief engineer in charge of upset division for the firm.

Gwin, who succeeds Mongerson as factory manager, now assumes responsibility for all plant operations. Mongerson has been with Chicago Screw since 1946, Gwin since 1949. Langille joined the engineering department in 1947.

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INDEX TO ADVERTISERS

AUTOMATE OR DIE

This sounds almost as melodramatic as the well known 'Research or Die' cliche. So much depends on each individual manufacturer's problems that such generalizations raise more smiles than fears. And yet, basically, it is not an untruth, the subject is merely over-stated.

The subject was sharply focused by a small manufacturer who makes clips which fasten the chrome trim to automobile bodies. At a labor rate of $2.75 per hour he could not compete with out-of-state firms giving a labor rate of $2.00 or less. His only answer to survival: (1) Reduce the number of $2.75 units; (2) Produce more with the remaining $2.75 units. That meant automating his processes wherever possible. He has been more than successful, outproducing his competitors, meeting their prices and at the same time delivering a higher quality product.

Whether you're a large manufacturing facility or a small one-product manufacturer, the basic lesson is the same: automate. And where are the rewards larger than in the assembly department which traditionally has accounted for the largest share of direct labor cost? Automation is not only desirable, but an urgent necessity. All that is needed is to think about improvements.

Can automatic riveting machines be used? (You might think this an idle question but one of the country's largest companies still has rows of girls pounding rivets with a hammer.) Can you use automatic screw feeders and drivers? Automatic welding lines? What about brazing 50-100 parts at a time? And if you believe that certain mechanical aids cannot be utilized, are you quite sure that a slight design change will not permit a different fastening method with resultant gains in output and lowering of cost? As for the urgency of mechanization: there is a definite squeeze on profits, there is a constant increase in costs, there is the threat of low-priced imports and keener domestic competition.

I am aware that the cost-profit problems cannot be isolated in terms of automating the assembly department; nor will this provide the final answer to what is indeed a complex problem and one which will result in far-reaching economic changes in this country and abroad. However, a problem can be solved if it is reduced to many parts and each part attacked with vigor and imagination. And we begin by changing our method of looking at each fastening and assembly problem. The method is simple: merely say about each fastener and assembly, "It's not good enough, there's a faster way of doing it."

Wm. J. Schleicher

Vice President & Editorial Director

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A new, lower silhouette and reduced hex for the Flyweight series aids miniaturization and weight reduction by allowing shorter bolts, smaller wrenches and narrower bolting flanges. And while reduced in both size and weight, the new Flyweight series hex nut actually provides *more cubic content of metal supporting the threads* than on current sheet metal nut designs . . . allowing for higher wrench torques and longer fatigue life. By replacing up to nineteen assorted hex nuts, the new Boots fastener greatly simplifies inventory and procurement . . . allows time-saving, money-saving standardization on your production line while reducing final product weight! Can be used with either open end or box wrenches.

FLYWEIGHT T99 — Low beam fulfilling NAS697, NAS-679W, AN363, AN364, AN365, NAS1021, NAS1022, MS20364, MS20365, requirements.

T99S — AMS6304 in Chrome-Moly Vanadium Alloy Steel . . . Nickel Cadmium, diffused plating . . . offering two-in-one advantages of 160,000 PSI for 550 . . . 90,000 PSI for 900° at one-fifth the cost of stainless.

T99C — A286, AMS5735 for low magnetic permeability requirements.

T99B — in brass for high electrical conductivity and low strength brass screw applications.

FLYWEIGHT T100 — High beam fulfilling AMS5735, A286 requirements.

T100C — superlight and small for 1,300° applications . . . high beam configuration for standard and reduced PD bolts.

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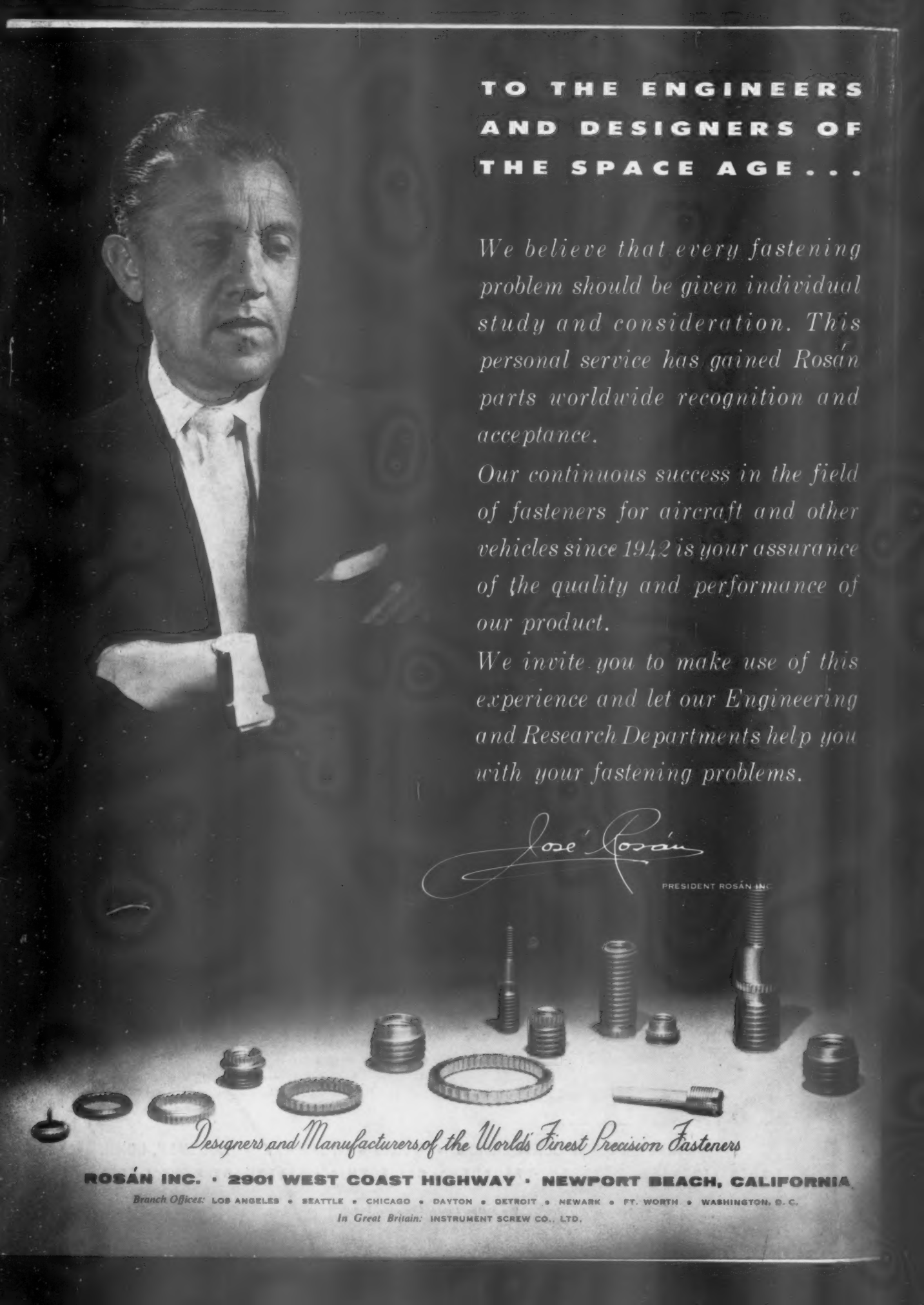
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